WARZYN

Report
13928.11

# Alternative Water Supply
# Interim Remedial Measures
# Refuse Hideaway Landfill
# Town of Middleton
# Dane County, Wisconsin

Agreement No. 81217.89-2

Prepared for:
Wisconsin Department of Natural Resources
Madison, Wisconsin

Prepared by:
Warzyn Engineering Inc.
Madison, Wisconsin

December 1989

WARZYN

Engineers & Scientists
Environmental Services
Waste Management
Water Resources
Site Development
Special Structures
Geotechnical Analysis

December 21, 1989

Ms. Theresa A. Evanson
Wisconsin Department of Natural Resources
Bureau of Solid & Hazardous Waste Management
101 S. Webster Street, GEF II
Box 7921
Madison, Wisconsin 53707

Re: Alternative Water Supply Report
Interim Remedial Measures
Refuse Hideaway Landfill
Town of Middleton, Wisconsin
Agreement No. 81217.89-2
Project No. 13928.11

Dear Ms. Evanson:

As part of our Interim Remedial Measures Contract we have completed a report entitled, "Alternative Water Supply". These services are part of Phase I, Task I, as described in our May 25, 1989 Proposal for Services (on which the Contract is based).

The attached report provides an assessment of the various methods to provide a permanent source of potable water to the residences whose private water supply has apparently been affected by the Refuse Hideaway Landfill. It presents the findings of our assessment program, including cost estimates and discussion of each alternative's ability to provide a satisfactory quantity and quality of potable water.

We submitted the report in draft form in November 1989 to obtain the WDNR's comments prior to final submittal as the alternatives addressed have many social as well as financial ramifications. We received the WDNR's review comments in a letter dated December 6, 1989 and subsequently incorporated them into this report.

Warzyn Engineering Inc.
One Science Court
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

As you requested, we are enclosing 10 copies of the report for your use and distribution to the interested municipalities and affected homeowners.

Sincerely,

WARZYN ENGINEERING INC.

Steven C. Termont-Schenk, P.E.
Task Manager

Joel V. Schittone, P.E.
Project Manager

STS/skb/JVS/TFL
[dlk-111-56]
13928.11

Enclosure: Alternative Water Supply Report (10)

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# Alternative Water Supply
# Interim Remedial Measures
# Refuse Hideaway Landfill
# Town of Middleton
# Dane County, Wisconsin

December 1989

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## TABLES



## FIGURES



STS/skb/STS
[dlk-601-93a]
13928.11

WARZYN

# SECTION 1
# INTRODUCTION

## Authorization

The Wisconsin Department of Natural Resources (WDNR) has retained Warzyn Engineering Inc. (Warzyn) to provide consulting and engineering services in connection with the Refuse Hideaway Landfill. The initial Scope of Work is described in Warzyn's May 1989 proposal, entitled "Refuse Hideaway Landfill, Interim Remedial Measures, Town of Middleton, Dane County, Wisconsin".

## Scope of Work

This report has been prepared to summarize activities and findings under project Subtask 1B, Alternative Water Supply. The purpose of the subtask is to evaluate the technical and administrative feasibility of providing permanent, alternative sources of potable water for the Schultz, Stoppleworth and Swanson properties. This report presents a preliminary screening of alternatives identified in our May 1989 proposal as well as those identified through our literature review, to determine their suitability in providing the three affected households with potable water. The analysis was conducted using criteria described in Section 3 of this report.

Costs based on conceptual designs were developed for each alternative considered to be technically feasible. This feasibility assessment utilizes existing data; however, in some instances insufficient information was available to support a thorough feasibility analysis of an alternative. Where possible, the need for additional information is identified. A detailed analysis of the remaining alternatives and selection of one for implementation are not within the scope of this evaluation.

# SECTION 2
# BACKGROUND

## Summary of Problem

Background information, used in the preparation of this report, was obtained from reports entitled "In-Field Conditions Report, Refuse Hideaway Landfill, Middleton, Wisconsin", January 1988, and "Remedial Action Report, Consent Order SOD-88-02A, Refuse Hideaway Landfill, Middleton, Wisconsin", November 1988. Both reports were prepared by RMT, Inc., Madison, Wisconsin.

Water samples from the Schultz, Stoppleworth and Swanson residences have indicated the presence of halogenated alkyl hydrocarbons. These are typically synthetic organic compounds and their transformation products. The halogenated compounds detected in water samples from these private residences are part of a larger group of substances commonly referred to as volatile organic compounds (VOCs). Bottled water is currently provided to the residences for potable use, with the private well water used to meet other water needs. At least three factors motivate the search for alternatives to this situation: (1) the use of bottled water is inconvenient, (2) there are potential health risks associated with nonpotable uses of the well water (such as bathing), and (3) VOC contamination is anticipated to continue in the near future. Point-of-entry treatment of the existing water supply, as an interim solution, is currently being evaluated.

Available information indicates the VOCs detected in samples from the private water supply wells originated from chemicals released from the Refuse Hideaway Landfill (Site). The three affected private wells are located downgradient of the Site. The lateral and vertical extent of contaminant occurrence in area groundwater is not known. However, available information on the private wells indicates VOC contamination may be present from near the water table to depths greater than 200 ft.

## Geology and Hydrogeology

The following brief discussion of geology and hydrogeology in the vicinity of the Site provides the basis for evaluating alternative local groundwater supplies. The Site is located in the Moraine physiographic area of Dane County, as described by Cline (1965). This area consists of several elongated

hills comprised of glacial till materials, with a northwest to southeast trend. The Site is located approximately 1 mile east of the Johnstown Moraine, a terminal moraine of the Quaternary glacial system (Cline, 1965).

Unconsolidated soils in the area of the Site are of glacial origin. These soils typically consist of unsorted and unstratified till deposits, ranging in size from clay to boulder. Outwash and alluvial deposits are also located near the Site in the vicinity of Black Earth Creek (Cline, 1965). In the vicinity of and to the immediate west of the Site, tills are typically less than 20 ft thick, as determined from local well drillers' domestic water supply records.

Lower Ordovician dolomite of the Prairie du Chien group typically forms the upper bedrock unit in the area. The dolomite ranges from approximately 10 to 150 ft thick, according to drillers' domestic water supply records. Upper Cambrian Sandstone lies below the dolomite.

The sandstone serves as the primary water supply aquifer in the area. The majority of domestic wells in the vicinity of the Site are cased into the dolomite, with an open borehole extending into the upper Cambrian Sandstone. The total depth of these wells range from 110 to 310 ft. Exceptions include the Swanson well which is only approximately 25 ft deep and located in the unconsolidated soils. Specific capacities calculated for area wells range from 720 gpd/ft to 8352 gpd/ft.

The Site is located within the Wisconsin River groundwater basin, west of the regional groundwater flow divide which separates flow westward toward the Wisconsin River from flow eastward toward the Yahara River basin. The Site is also located north of the regional groundwater flow divide which separates flow toward the Wisconsin River from flow southward toward the Sugar River basin.

Local groundwater flow direction is influenced by Black Earth Creek, which receives discharge from the regional groundwater flow system. Flow in the vicinity of the Site is toward the south and southwest, toward Black Earth Creek.

# SECTION 3
# WATER SUPPLY ALTERNATIVES

## Alternatives Identified

The following alternatives were identified to provide water to the private residences from either an existing source or from a new source.

- Installing a lined pond on-site*,
- Installing new wells at each residence,
- Continuing use of point-of-entry treatment systems,
- Extending municipal water service from either Cross Plains or Middleton,
- Installing a storage tank capable of storing potable water hauled from existing off-site sources,
- Installing a community well off-site, and
- Installing a community well on-site*.

*On-site - in the vicinity of affected residences.

## Screening Criteria

Each alternative was evaluated using the following criteria:

- Technical feasibility,
- Water quality and quantity,
- Long-term reliability,
- Administrative feasibility, and
- Installation, operation and maintenance costs.

Screening criteria are discussed in more detail below.

### Technical Feasibility

The screening process considers an alternative's ability to reach project goals and its implementability within the constraints of the project. Technical considerations include such things as contaminant removal efficiencies or maintaining adequate water system pressure, and the ability to construct desired components of a system under State regulations and prevailing site conditions.

Water Quality and Quantity

Each alternative was evaluated considering its ability to supply a sufficient quantity of water for anticipated household uses. Water usage is assumed to be 5000 gallons per month per household (based on metered water usage at the Schultz and Stoppleworth residences) with a peak flow of 10 gallons per minute per household. Water quality must be acceptable based on consideration of the water's chemical and bacteriological constituents. State public drinking water supply standards were considered as guidelines.

Long-Term Reliability

Since a permanent water supply is desired, only those alternatives that can provide an uninterrupted long-term water supply of consistent quality will be acceptable.

Administrative Feasibility

Many of the alternatives rely on the policies of local and state governments. Therefore each option was evaluated considering a variety of non-technical issues, including specific administrative restrictions or requirements, and the potential views and concerns of members of the community.

Installation, Operation and Maintenance Costs

Many assumptions were made in determining the costs of each alternative. These assumptions have been included in the discussion of the alternatives.

The costs presented in this report are preliminary and should be used for comparison purposes only. As previously stated, a detailed design of each alternative, necessary for more precise costs, was beyond the scope of this report. Engineering design costs have been included for each alternative at between 20 and 30 percent of the capital cost depending on the magnitude of these costs.

A summary of estimated costs for each alternative considered feasible is presented on Table 1.

## Screening of Alternatives

### Installing a Lined Pond On-Site

Installing a lined pond at each residence would not be a viable alternative and can be eliminated from further discussion at this point based on the difficulty associated with providing the security systems necessary to insure the water could not be contaminated by vandals and other sources. Lined pond water would require expensive treatment before use and would require a large area. A suitable location is not available in the area of the affected residences.

### Installing a New Well at Each Residence

Replacing the existing private wells at each residence would require the installation of much deeper wells extending into an uncontaminated zone of the aquifer. Such a well would require an extensive hydrogeologic investigation to characterize the vertical extent of contamination. Other alternatives (discussed later in this section of the report) utilize a deep well in a more efficient community well application, the alternative of new wells at each residence is eliminated from further consideration.

### Continuing Point-of-Entry Systems

Point-of-Entry treatment systems which treat the contaminated water before distribution throughout the home are presently being planned for installation at the three residences as part of project Subtask 1A. These systems may include carbon adsorption units for removal of organic compounds from well water. The quality of the treated water would be monitored and the system components approved by the Department of Industry, Labor and Human Relations (DILHR) before the devices can be installed at a residence.

The quantity of water should be sufficient because the systems proposed are treating water from a source currently being used by the residences. At this time, it is anticipated that system pressures adequate for domestic requirements can be obtained using the devices under consideration.

Reliability of the systems may fluctuate over time as the groundwater quality varies. Compounds not easily removed by the carbon adsorption units may appear in the treated water. Fluctuations in contaminant concentration in the

groundwater may affect the time between carbon unit replacements. This would necessitate frequent monitoring of the system for an indefinite period of time. Routine sampling of the systems would be required to monitor treatment system performance. Access and control of the treatment systems are limited because the units are contained within private homes. This may cause difficulty in achieving an efficient monitoring program.

Annual operation and maintenance costs for this alternative include the replacement of the carbon, routine maintenance, routine sampling and analysis, and project management. Since the units would be in-place and operating, no additional capital costs would be necessary. Annual costs would be approximately $53,000 (Table 2), assuming the system consists of carbon units in series, with carbon unit replacement at 15,000 gallons at each residence. This estimate also includes costs associated with monthly sampling and analysis of all three systems and progress reports.

Extending Existing Water Service

Both the Village of Cross Plains and the City of Middleton have water distribution systems, and, from an engineering perspective, either system could be extended to provide the affected homes with potable water.

A water main extending from the Cross Plains system would extend approximately 16,600 feet along U.S. HWY 14, would cross Black Earth Creek twice, and include a booster pump station. From the Middleton system, the water main would be approximately 13,500 feet long, and would run along U.S. Highway 14, cross a drainage ditch twice, and also include a booster pump station. Drawing 13928-B2 provides a general location of these two alternatives.

Both options would include crossing U.S. Highway 14 and railroad tracks because affected residences are located on both sides of the highway. The booster pumps and pipe size would be designed to maintain system pressure at a minimum of 20 psi, taking into account peak water demand and fire protection allowances. The quality of the water would be no different from water being supplied to the neighboring communities. The reliability of this system should be very high since the water would be obtained from an established water utility.

An administrative drawback to this option is the likely unwillingness of either utility to provide service without annexing the area to include the affected residences. The annexation would likely involve several properties in addition to the affected residences. Demands on the City/Village would therefore be greater than that required for the three residences in question. At this time, the long-range planning of neither the City or Village include significant further annexation along the U.S. Highway 14 corridor. Clearly, a number of planning issues must be addressed for this alternative.

Capital costs estimated for this alternative include installation of water lines, booster pump station and service connections to the three affected residences only. Annual operation and maintenance costs include the utility's rates for water usage and energy costs. Capital costs are estimated to be $749,000 for extending the Cross Plains system and $612,000 for extending the Middleton system. Annual costs for both options would be approximately $4,000. Refer to Table 2 for a breakdown of these costs.

Water Storage Tank

A buried water storage tank could be installed as a community reservoir located on or adjacent to the properties of the affected residences. Water would be supplied to the storage tank by tanker truck from Middleton's water system on a bi-weekly schedule. A 15,000 gallon tank would supply the three households with water for approximately one month. A suction pump would be installed to distribute water to a pressure tank located in each household. An automated chlorination system would be required to discourage bacterial growth and avoid slime, taste and odor problems. A liquid solution of chlorine would be added to the tank to maintain an optimum chlorine concentration. Water in the tank would also be recirculated to facilitate mixing of the chlorine, and an activated carbon filter may be required before distribution to the residences to remove excess chlorine.

Other variations to this alternative exist, such as:

- The size of the storage tank could be increased to reduce the refilling frequency,

- Two storage tanks could be installed, one on either side of U.S. Highway 14. This would avoid crossing the highway and railroad tracks with a water line,
- Install a single tank at each residence. This would give the homeowner more control over their water supply and would also reduce refilling frequency.

The cost of each of these options will vary. At this time we have estimated the costs for only the configuration initially described. Further evaluation of other water storage tank configurations can be conducted if this alternative is feasible and acceptable to the various residences.

Capital costs estimated include installation of the tank, suction pump, chlorination system and distribution lines from the tank to residences. Capital costs are estimated to be $61,000. Annual operation and maintenance costs would include water purchase and delivery fees and chlorine. Annual costs are estimated to be $12,000. A breakdown of costs are presented in Table 2.

Community Well: Off-Site

A water supply well could be installed approximately one mile south of the affected households, in an area that is hydrogeologically isolated from the Site. The well would be located on Twin Valley Road, just north of Old Sauk Road. Drawing 13928-B2 provides an approximate location for this alternative.

A water main would carry water from the well to the three homes. The 9,300 linear ft water main would cross Black Earth Creek, U.S. Highway 14 and the railroad tracks. A backup storage tank would be included adjacent to the well. The well would be cased to about 150 ft and would have an open hole to approximately 250 ft. These depths are consistent with other private wells in the area. A monitoring well would be installed prior to water supply well construction to verify well depths, determine pumping rates, and assess water quality.

The groundwater flow direction in the vicinity of the proposed well is anticipated to be toward the north (in the direction of both the Black Earth Creek and the contaminated groundwater plume), based upon existing regional data (Cline, 1965). Therefore, based on existing data, it is unlikely the proposed well would be affected by contamination from the Site.

To confirm these assumptions and provide a better understanding of the lateral and vertical extent of the contaminant plume, a total of six monitoring wells would be installed at 3 locations (3 water table wells and 3 piezometers). A total of 1350 feet of drilling has been assumed for the three well nest locations. Water samples would be collected from each well to determine groundwater quality. Groundwater flow direction and gradients would also be determined from the wells.

The well would be constructed according to all applicable local and state regulations. Obtaining property for the well and obtaining easements for the pipeline will be required. Capital costs for this alternative have been estimated to be $395,000. These costs include monitoring and water supply well installation, water main construction, booster pump station and land and easement acquisition. Annual operation and maintenance costs are estimated to be $4,000, which includes operation of the pumps and minor maintenance. Refer to Table 2 for a breakdown of the estimated costs for this alternative.

Community Well: On-Site

A well would be installed on or adjacent to the Schultz or Stoppleworth property. The well would collect water from a deeper zone in the aquifer than the contaminated zone presently being used. This alternative assumes the deeper zone is not contaminated.

Based on the local geology, the well may be cased to 600 feet and may have an open hole and/or screen to 800 ft. The well diameter and open hole/screen length would be made relatively large to limit vertical flow in the vicinity of the well. This conceptual design is intended to limit the potential for downward movement of the contaminant plume.

A water service line would connect the three households to the well. The water service to the Swanson property would cross U.S. Highway 14 and the railroad tracks.

Monthly sampling and analysis of the well water for VOCs is necessary as there is the potential for drawing contamination to the well.

A better understanding of the lateral and vertical extent of the contamination plume is required before installation of the supply well could begin. A monitoring well would be constructed prior to supply well construction, to verify well depths, determine pumping rates and establish the vertical extent of contamination. The well would be constructed according to applicable local and state regulations.

Capital costs for this alternative have been estimated to be $163,000 and include monitoring and water supply well installation, holding tank and service connections. Annual operation and maintenance costs are estimated to be $14,000 which includes operation of the pumps and minor maintenance, water quality sampling, analysis, and progress reports. Table 2 presents a breakdown of estimated costs for each alternative.

# SECTION 4
# CONCLUSIONS

## Summary of Costs

Table 1 provides a summary of the capital and annual costs discussed in this report. These costs are based on a preliminary design of each alternative and should only be used for comparative purposes.

## Conclusions

- Extending the existing water service from either Cross Plains or Middleton does not appear to be an administratively viable alternative because of the need to annex the affected property. In addition, this alternative is relatively costly. However, based on our conversations with the affected residents, supplying a town water supply is the only alternative which will return their properties to the prior value.

- The long-range planning goals of the two communities and the Dane County region should be considered before this alternative is eliminated from further consideration.

- The long-term reliability of continuing the Point-of-Entry systems and installing a water storage tank is questionable. The success of these alternatives depends on the uninterrupted service necessary to the operation of the systems. However, these alternatives, although economically attractive, may not be socially acceptable.

- The long-term reliability of installing a community well on-site is also questionable, due to the possibility for contamination to be present in the lower aquifer or for contamination from the upper aquifer to move downward, contaminating the lower aquifer. Preliminary testing of the water quality in the lower aquifer and pump tests may provide some insight as to the future success of this alternative. A better understanding of the lateral and vertical extent of the contamination plume is required to confidently move ahead with this alternative.

- Installing a community well off-site is perhaps a more reliable alternative than an on-site well, however, it is more costly.

**Summary**

This report presents a number of viable water supply alternatives, each with their relative merits, drawbacks, and associated costs. Sufficient detail has been provided so that an administrative review can be made of the alternatives which will lead to a prudent coarse of action. The final determination will require the combined input of the affected homeowners, the neighboring communities and their planning boards and the WDNR. Once an alternative has been chosen, a detailed design of that alternative can begin.

## SECTION 5

## REFERENCES


Cline, D.R., 1965, Geology and Groundwater Resources of Dane County, Wisconsin: USGS Water-Supply Paper 1779-U.

RMT, Inc., January 1988, In-Field Conditions Report, Refuse Hideaway Landfill, Middleton, Wisconsin.

RMT, Inc., November 1988, Remedial Action Report, Consent Order SOD-88-02A, Refuse Hideaway Landfill, Middleton, Wisconsin.

Warzyn Engineering Inc., May 26, 1989, Proposal, Interim Remedial Measures, Refuse Hideaway Landfill, Middleton, Wisconsin, Warzyn Proposal No. 81217.

Warzyn Engineering Inc., October 19, 1989, Revised Scope of Work, Interim Remedial Measures, Refuse Hideaway Landfill, Middleton, Wisconsin, Warzyn Job No. 13928.

## Table 1

## Summary of Estimated Costs

| Alternative | Capital Cost | Annual Operating Cost |
|---|---|---|
| I. Continue Point-of-Entry Systems | --- | $53,000 |
| II. Extending Water Service (does not incl. annex.) | | |
| A. Cross Plains | $749,000 | $4,000 |
| B. Middleton | $612,000 | $4,000 |
| III. Installing Water Storage Tank | $61,000 | $12,000 |
| IV. Installing Community Wells | | |
| A. Well Off-Site | $395,000 | $4,000 |
| B. Well On-Site | $163,000 | $14,000 |

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Table 2

Estimate of Costs

## I. Continuing Point-of-Entry Systems

### CAPITAL COSTS

-None-

### ANNUAL OPERATIONS AND MAINTENANCE COSTS

| | |
|---|---|
| Carbon Replacement and Disposal | $ 9,000 |
| Sampling and Analyses | 32,000 |
| System Maintenance | 3,000 |
| Project Management | 9,000 |
| Total O&M Costs | $53,000 |

## II. Extending Existing Water Service

### A. From Cross Plains

### CAPITAL COSTS

| | |
|---|---|
| Water Line Installation | $591,000 |
| Service Connections | 3,000 |
| Booster Pump Station | 30,000 |
| Subtotal Capital Costs | 624,000 |
| Engineering Costs (20%) | 125,000 |
| Total Capital Costs | $749,000 |

### ANNUAL OPERATIONS AND MAINTENANCE COSTS

| | |
|---|---|
| Water Usage Fees | $ 250 |
| Power and Maintenance Requirements | 3,750 |
| Total O&M Costs | $4,000 |

Table 2
(Continued)

## B. From Middleton

### CAPITAL COSTS

| | |
|---|---|
| Water Line Installation | $478,000 |
| Service Connections | 2,000 |
| Booster Pump Station | 30,000 |
| Subtotal Capital Costs | 510,000 |
| Engineering Costs (20%) | 102,000 |
| Total Capital Costs | $612,000 |

### ANNUAL OPERATIONS AND MAINTENANCE COSTS

| | |
|---|---|
| Water Usage Fees | $ 250 |
| Power and Maintenance Requirements | 3,750 |
| Total O&M Costs | $4,000 |

## III. Water Storage Tank

### CAPITAL COSTS

| | |
|---|---|
| Underground Water Storage Tank, (15,000 gal) | $20,000 |
| Distribution Pipes and Appurtenances | 21,000 |
| Pump | 3,000 |
| Chlorination System | 3,000 |
| Subtotal Capital Costs | $47,000 |
| Engineering Costs (30%) | 14,000 |
| Total Capital Costs | $61,000 |

### ANNUAL OPERATIONS AND MAINTENANCE COSTS

| | |
|---|---|
| Water Purchase Fee | $ 400 |
| Water Delivery Fee | 10,400 |
| Chemical Costs | 100 |
| Power and Maintenance Requirements | 1,100 |
| Total O&M Costs | $12,000 |

Table 2
(Continued)

## IV. Installing New Well

### A. Off-Site

CAPITAL COSTS

| | | |
|---|---|---|
| Well Installation | | $ 18,000 |
| Pump and Storage Tank | | 16,000 |
| Water Line Installation | | 166,000 |
| Service connections | | 2,000 |
| Sampling and Analysis | | 3,000 |
| Monitoring Wells | | 53,000 |
| Land and Easment Aquisition | | 24,000 |
| | Subtotal Capital Costs | $316,000 |
| | Engineering Costs (25%) | 79,000 |
| | Total Capital Costs | $395,000 |

ANNUAL OPERATIONS AND MAINTENANCE COSTS

| | | |
|---|---|---|
| Power Requirements | | $3,500 |
| Maintenance | | 500 |
| | Total O&M Costs | $4,000 |

### B. On-Site

CAPITAL COSTS

| | | |
|---|---|---|
| Well Installation | | $56,000 |
| Pump | | 8,000 |
| Distribution Pipes and Appurtenances | | 33,000 |
| Sampling and Analysis | | 1,000 |
| Monitoring Well | | 32,000 |
| | Subtotal | $130,000 |
| | Engineering Costs (25%) | 33,000 |
| | Total Capital Costs | $163,000 |

ANNUAL OPERATION AND MAINTENANCE COSTS

| | | |
|---|---|---|
| Sampling, Analysis and Reporting | | 10,000 |
| Power Requirements | | 3,500 |
| Maintenance | | 500 |
| | Total O&M Costs | $14,000 |

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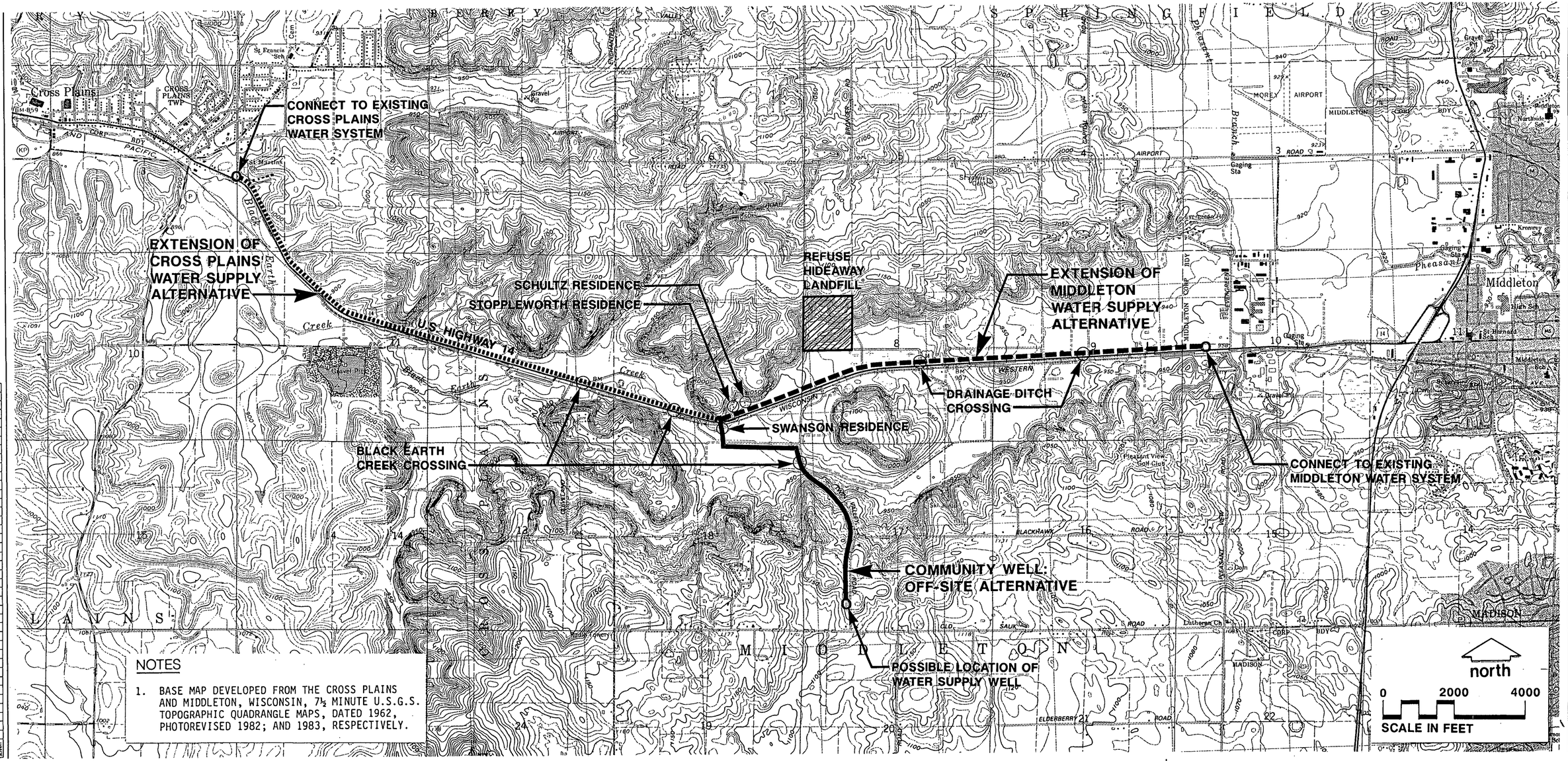


NOTES

1. BASE MAP DEVELOPED FROM THE CROSS PLAINS AND MIDDLETON, WISCONSIN, 7½ MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS, DATED 1962, PHOTOREVISED 1982; AND 1983, RESPECTIVELY.

ALTERNATIVE WATER SUPPLIES
INTERIM REMEDIAL MEASURES
REFUSE HIDEAWAY LANDFILL
SECTION 8, T7NR8E
TOWN OF MIDDLETON
DANE COUNTY, WISCONSIN

FIGURE NO. 1

Project Number 13928 B2

WARZYN

Designed by MAL
Drawn by KLL
Checked by MAL STS
Approved by Joel V. Williams
Date: 11/21/89
Reference:

Date - By - Appvd. Revisions



WARZYN
WARZYN ENGINEERING INC
Madison - Milwaukee
Minneapolis - Chicago
Atlanta

WARZYN

Engineers & Scientists
Environmental Services
Waste Management
Water Resources
Site Development
Special Structures
Geotechnical Analysis

November 30, 1989
13928.10

Ms. Theresa A. Evanson
Wisconsin Department of Natural Resources
Bureau of Solid Waste Management
101 S. Webster Street, GEF II, SW/3
Madison, Wisconsin 53707

Re: Point-of-Entry Water Treatment Report
Interim Remedial Measures
Refuse Hideaway Landfill
Town of Middleton, Wisconsin

Dear Ms. Evanson:

As part of our Interim Remedial Measures Contract (Agreement No. 81217.89-2), we have completed a report entitled "Point-of-Entry Water Treatment". These services are part of Task I, Subtask A, of Phase I, Point of Entry Treatment, Alternative Water Supplies, as described in our May 25, 1989 Proposal for Services (on which the Contract is based).

The attached report, along with relevant application material, are being submitted concurrently to both the Department of Industry and Human Relations (DILHR), Ms. Loretta Trapp; and to the WDNR, Division of Water Supply, Mr. Bob Schaefer. It is our understanding that this format of presentation is acceptable to all review agencies. If the filtration system, as proposed, is permitted by both DILHR and WDNR, we anticipate that installation of the recommended filtration systems could take place in January 1990.

This report presents the findings of our filtration unit assessment program, DILHR and WDNR applications and provides results of a pilot point-of-entry filtration system to support our recommendations. A "Product File No. 890217" was assigned by DILHR to the product recommended so that an expeditious product review could be achieved.

We are enclosing three copies of our report and can provide additional copies if you desire. Please contact us if you have any questions or if we may be of

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further service, such as preparing product documentation for submittal to the affected residences prior to installation.

Sincerely,

WARZYN ENGINEERING INC.

Steven C. Termont-Schenk, P.E.
Task Manager

Joel V. Schittone, P.E.
Project Manager

STS/jlv/JVS/WB
[jlv-111-68]

Enclosure: Point of Entry Water Treatment Report (3)

cc (w/enclosure): Mr. Bob Schaefer, WDNR (2)
Ms. Loretta Trapp, DILHR (2)

WARZYN

# Point-of-Entry Water Treatment
# Interim Remedial Measures
# Refuse Hideaway Landfill
# Town of Middleton, Wisconsin

November 1989

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## DRAWINGS



## APPENDICES



[jlv-601-39x]

# PRIVATE WATER SUPPLY
# POINT-OF-ENTRY TREATMENT
# REFUSE HIDEAWAY LANDFILL
# TOWN OF MIDDLETON, WISCONSIN

## SECTION 1
## INTRODUCTION

### Authorization

The Wisconsin Department of Natural Resources (WDNR) has retained Warzyn Engineering Inc. (Warzyn) to provide consulting and engineering services in connection with the Refuse Hideaway Landfill. The initial Scope of Work and subsequent revisions and Work Orders have been described in detail in previously submitted documents (Warzyn, 1989a; Warzyn, 1989b; Warzyn, 1989c).

### Purpose and Scope

This report has been prepared to summarize activities and findings under Project Subtask 1A of our Contract, relating to Point-of-Entry Treatment. The purpose of the subtask is to obtain and evaluate information relevant to assessing the technical and administrative feasibility of providing point-of-entry treatment for private water supplies affected by volatile organic chemical contamination. Point-of-entry treatment infers treatment of the entire household water supply, before distribution of the water throughout the entire home. Activities under this subtask included raw water characterization (sampling, laboratory analysis and interpretation of results), identification of applicable treatment methods, treatment system design and preparation of Department of Industry and Human Relations (DILHR) permit applications for plumbing product approval (if necessary), WDNR applications approval and DILHR plumbing plan approval.

### Summary of Problem

This summary is based on information presented in the Infield Condition Report (RMT, 1988a), the Remedial Alternatives Report (RMT, 1988b), and information gathered by Warzyn during the current project.

The Refuse Hideaway Landfill is located in the SW 1/4 of the NW 1/4, Section 8 of Township 7N, Range 8E in the Town of Middleton, Dane County, Wisconsin (see Drawing 13928-A1). The landfill occupies approximately 23 acres of a 40 acre parcel owned by Refuse Hideaway, Inc. The landfill was constructed in glacial deposits with no liner or leachate collection system. Chemical constituents of groundwater samples indicate several contaminants have been released to the groundwater beneath the site. Available hydrogeologic information indicates groundwater flows away from the site to the southwest. The landfill operated from approximately 1974 through May 1988, at which time it was ordered closed by the WDNR. During its operation, the landfill reportedly received residential and commercial solid waste.

Three private residences are located southwest of the site within approximately 3,000 ft of the landfill property. Private water supply wells at the Schultz, Stoppleworth and Swanson residences, have been affected by substances apparently released from the Refuse Hideaway Landfill (the Wallen family resides in the property owned by Mr. Swanson). Water samples from the affected water supply wells have indicated the presence of halogenated alkyl hydrocarbons. These are typically synthetic organic compounds and their transformation products. The halogenated compounds detected in water samples from these private residences are part of a larger group of substances commonly referred to as volatile organic compounds (VOCs).

Bottled water is currently provided to the residences for potable uses, with the private well water used to meet other water needs. At least three factors motivate the search for alternatives to this situation: (1) the use of bottled water is inconvenient, (2) there are potential health risks associated with nonpotable uses of the well water (such as bathing), and (3) VOC contamination is anticipated to continue in the near future. Treating the entire household water supply at each residence (referred to as point-of-entry or POE treatment) was identified as an interim measure that would provide water users at the affected residences with a water supply suitable for normal domestic uses, including drinking. The scope of work outlined above was developed to address the POE treatment assessment. Options for longer-term water supply solutions at these properties are being assessed under another project subtask.

WDNR Interim Actions

Prior to performance of work on the project by Warzyn, the WDNR directed the installation of POE treatment devices at the Stoppleworth and Schultz residences. Two Spark-L-Pure units were installed in series at each of the two residences (July 24, 1989 at Stoppleworth, July 26, 1989 at Schultz).

Each Spark-L-Pure device essentially consists of a stainless steel canister equipped with inlet and outlet fittings and internals such that water entering the device is distributed to, and flows radially outward through, compressed powdered activated carbon cylinders before exiting the device. DILHR issued a product approval for Spark-L-Pure (manufactured by General Ecology, Inc.) on September 7, 1988. The approval recognized that the device removed 1,2-dibromoethane (10.6 ug/L influent to less than 0.02 ug/L effluent at 1 to 6 gal/min flow rate) and trichloroethene (265 ug/L influent to 210 ug/L effluent at 4 to 8 gal/min flow rate), with a 30,000 gal maintenance cycle (DILHR Product File 880319).

Results of VOC analyses for raw and treated water samples collected to assess the performance of the Spark-L-Pure devices are summarized in Table 1. The data indicate trichlorofluoromethane, cis-1,2-dichloroethene and tetrachloroethene were detected in the effluent of the first carbon unit (in-line) at the Stoppleworth residence after 1,379 gallons were treated (August 1, 1989 samples). After 10,826 gallons (September 27, 1989 samples), essentially complete breakthrough of trichlorofluoromethane was indicated, but the other two compounds were not detected in treated water samples. At the Schultz residence, no VOCs were detected in the first treated water sample collected (after 1086 gallons on August 1, 1989). After 8700 gallons (September 27, 1989 samples), 1,1-dichloroethane, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene and trichlorofluoromethane were detected in samples collected before and after the first carbon unit. The same compounds, except 1,1-dichloroethane, were detected in the sample collected after the second carbon unit. Complete breakthrough of trichlorofluoromethane was indicated. The carbon was replaced in the Spark-L-Pure units on October 26, 1989 at the Stoppleworth residence, and on October 27, 1989 at the Schultz residence.

It has been concluded that the units did not have an acceptably high capacity for removing the VOCs of concern in this application. Carbon element change intervals on the order of less than a few thousand gallons would likely be required to maintain non-detectable concentrations of VOCs in treated water. The data indicate even this frequent maintenance may not be effective. It is considered likely that the relatively early breakthrough of VOCs was due to the relatively low mass of carbon in the units. The units remain in service at this time, providing partial VOC removal for nonpotable water uses.

[jlv-601-39a]

## SECTION 2
## POINT-OF-ENTRY TREATMENT ASSESSMENT

### Raw Water Characterization

Raw water samples were collected at the three residences on September 21, 1989. A duplicate sample was collected at the Stoppleworth residence. Samples were analyzed for the parameters indicated in Warzyn's Refuse Hideaway Landfill Proposal (May 1989). Analytical laboratory reports are provided in Appendix A. Conductivity and pH measurements were made in the field. Results are summarized in Tables 2, 3, 4 and 5.

### Volatile Organic Compounds

Volatile organic compound (VOC) results indicate concentrations of the major identified VOCs are similar to those observed in the past. Some differences were noted between results from the State Laboratory of Hygiene (SLH) and from the Warzyn laboratory. Analytical results for VOCs detected in samples collected on September 21, 1989 are summarized in Tables 3, 4 and 5 for the Schultz, Stoppleworth, and Swanson (Wallin) wells, respectively. For comparison, VOC results for other SLH and Warzyn analyses are summarized. Taking into account the lower detection limits reported by the Warzyn lab, most compounds reported by one lab are also reported by the other, at similar concentrations.

Three notable exceptions are evident. First, the Warzyn lab reported dichlorodifluoromethane at concentrations ranging from approximately 6 to 16 ug/L; this compound was not analyzed by the SLH. Second, the Warzyn lab reported trichlorofluoromethane at concentrations on the order of 1 ug/L for samples where the SLH reported the same compound at concentrations ranging from 7 to 13 ug/L (Tables 3 and 4). Third, the Warzyn lab reported the detection of substances that were not specifically analyzed for (unknown, early eluting substances in the VOC analysis; Tables 3 and 4). These differences in reported results are important because the identification of substances is a critical part of assessing potential health risks. The occurrence of unknowns, in particular, dictates that a conservative approach to establishing treatment goals be established. Removal of the unknowns to non-detectable levels would be prudent.

Does SLH measure dichlorodifluoromethane w/ trichlorofluoromethane?

Of the VOCs detected, only 1,2-dichloroethane (1,2-DCA), trichloroethene (TCE), and 1,1,1-trichloroethane, (1,1,1-TCA) are regulated in public water supplies at the state and federal level (40 CFR, Part 141). The recommended maximum contaminant level (RMCL) is zero for 1,2-DCA and for TCE. The RMCL for 1,1,1-TCA is 200 ug/L. In addition, State of Wisconsin public health-related groundwater standards have been established for a number of the VOCs detected in these samples (Chapter NR 140, WAC). The regulated compounds are listed below along with preventive action levels (PAL) and enforcement standards (ES).

| Substance | PAL | ES |
|---|---|---|
| 1,1-Dichloroethane | 85 ug/L | 850 ug/L |
| 1,2-Dichloroethane | 0.05 ug/L | 0.5 ug/L |
| cis-1,2-Dichloroethene | 10 ug/L | 100 ug/L |
| trans-1,2-Dichloroethene | 20 ug/L | 100 ug/L |
| Fluorotrichloromethane | 698 ug/L | 3490 ug/L |
| Methylene Chloride | 15 ug/L | 150 ug/L |
| Tetrachloroethene | 0.1 ug/L | 1 ug/L |
| Toluene | 68.6 ug/L | 343 ug/L |
| 1,1,1-Trichloroethane | 40 ug/L | 200 ug/L |
| Trichloroethene | 0.18 ug/L | 1.8 ug/L |

Health-related standards or concentration goals were consistently exceeded for trichloroethene and tetrachlorethene.

Treatment for VOC removal is appropriate for all three residences.

General Water Chemistry

Conventional parameter analysis results are summarized in Table 2. Typical major anions and major cations were selected for the analytical parameter list. Charge balance calculations indicate a slight excess of cations over anions for all four samples. Calculated percent differences (Standard Methods, 1989) were less than 3.7% in all cases. The highest differences were observed for the Stoppleworth samples. These samples were colored and turbid. It may be that analytical concentrations (for unfiltered samples) are greater than the actual dissolved cation concentrations. Ionic strength was calculated for each sample using: (1) the definition of ionic strength and

(2) an empirical relationship between ionic strength and specific conductance (Snoeyink and Jenkins, 1980). Calculated relative percent differences for the values obtained using the two methods were 13.0% (Stoppleworth), 4.37% (Schultz) and 0.87% (Swanson/Wallin). Considered together, this information indicates a reasonably good accounting of major ionic species in the samples, although there is some discrepancy in the anion-cation balance for the Stoppleworth samples.

Calcium Carbonate Scaling

The bulk of the calcium and magnesium hardness is carbonate hardness in all four samples. Langlier saturation index (SI) values were calculated to provide an indication of the $CaCO_3$ scale depositing or dissolving tendency of the water. The SI values are considered to be good indicators of the potential for scale formation in the carbon bed. The SI values indicate a slight $CaCO_3$ scale-dissolving tendency at 10°C, and a slight depositing tendency at 25°C. The values do not indicate a potential problem that would require treatment for hardness reduction.

If hardness reduction were to be employed as a precautionary measure, using conventional sodium cycle ion exchange softening, calculations indicate that treated water sodium concentrations would be on the order of 180 mg/L. At this concentration, aesthetic effects may be apparent to some consumers, and individuals on a restricted sodium intake program may be affected.

It is recommended that ion exchange softening treatment not be added for hardness removal at any of the three residences in connection with treatment for volatile organic compound (VOC) removal. Existing softening units could remain without adversely affecting carbon adsorption unit performance.

(*) No water softener ↓ existing ones can stay

Iron and Manganese

Iron and manganese concentrations were determined to assess the potential for precipitate formation and fouling of the carbon units. Precipitates associated with iron and manganese could result from inorganic chemical and/or microbially-mediated oxidation and precipitation reactions. Both iron and

manganese concentrations in the Schultz and Swanson (Wallin) samples were below public water supply drinking water standards (iron, 0.3 mg/L and manganese, 0.05 mg/L), which were established principally for aesthetic reasons (40 CFR Part 142). There does not appear to be a potential iron and manganese precipitation problem at those two residences. Iron and manganese concentrations in the Stoppleworth samples were approximately 4.7 mg/L and 0.17 mg/L, respectively. The samples were brownish colored and turbid at the time of collection. Iron and manganese are therefore considered to be potential problems at the Stoppleworth residence.

Available information at the Stoppleworth residence indicates the existing iron filter is effective in reducing the potential fouling of the Spark-L-Pure units. The existing iron filter should be adequate for addressing potential iron and manganese problems, although media replacement would be prudent. If this unit is not adequate, then conventional ion-exchange softening can be used. At the Stoppleworth residence, this would involve repiping to place the existing softeners in-line ahead of the carbon unit. This option is less desirable than using the existing iron filter, because of costs and considerations related to sodium discussed earlier.

Bacteria

Samples were analyzed for total coliforms, fecal coliforms and fecal streptococcus (strep). Results indicated no coliform bacteria were detected. Fecal strep colonies were identified in one of the Stoppleworth samples and in the Wallin sample. These results were not conclusive because of the discrepancy in fecal coliform results at the Stoppleworth (100/100 mL) and Stoppleworth - duplicate (0/100 mL) samples. Samples were collected again at the Stoppleworth and Swanson (Wallin) residences and were analyzed for fecal strep only. Results indicate fecal strep colony counts of less than 1/100 mL. In terms of the coliform and fecal strep analysis results, it appears the water at the three residences is bacteriologically acceptable. Water treatment for modification of chemical constituents is therefore considered a viable option.

Total Organic Carbon

Total organic carbon concentrations were reported as less than 1 mg/L for all four samples. Gross contamination by organic substances is not indicated. Therefore, the low concentration of organic matter present in the water will have a minimal affect on carbon capacity for VOC adsorption due to competition for adsorption sites.

Treatment Technology Options

The presence of VOCs has been identified as the primary water quality concern for the three residences affected. Two basic VOC treatment approaches are possible: (1) contaminant destruction, and (2) contaminant removal.

Contaminant Destruction

Contaminant destruction would be desirable if effective and reliable means of accomplishing this at a reasonable cost could be identified. Several of the VOCs present have been shown to be degradable by bacteria. However, maintaining a biological treatment process in a private water supply treatment situation would not be a viable option for the following reasons:

- The feasibility of obtaining complete contaminant destruction is by no means certain.
- The required nutrient addition and control of other growth factors would likely not be compatible with producing potable water.
- Extensive testing would be required to determine the basic feasibility of this treatment.

Destruction by chemical oxidation is potentially more promising. Chemical feed equipment is available for private water supply applications, and a number of chemical oxidants have a history of safe and effective use in potable water treatment. In this application however, it may be impractical to closely monitor or control the process. The uncertainties associated with possible incomplete compound destruction and the production of reaction products of unknown toxicological characteristics make this option less desirable.

Contaminant Removal

The most straightforward options for contaminant removal are: (1) stripping, (2) reverse osmosis, and (3) adsorption.

Stripping involves transferring volatile dissolved components of a solution from the liquid phase (water) to the gas phase (air). Packed towers have been used for single-home POE water treatment. Effective VOC removal can be obtained and the system is relatively simple. The major drawback is that the well pump, an air blower and a repressurization pump must all be operating simultaneously. Maintaining all three systems is critical. Precipitates that may be formed due to the air and water contact (iron and manganese oxides, for example) would require removal by filtration. The overall VOC removal capacity is limited by the equipment size, tower packing type and size and blower capacity. With careful design, capacity to respond to variable influent concentrations is possible, but these changes would not necessarily be detected with occasional monitoring. Erratic VOC effluent concentrations are possible.

Stripping by aeration in a pressurized tank is also feasible. In this type of system, only the well pump and an air blower would be required. Effective VOC removal could be accomplished. The considerations related to variable raw water VOC concentrations are the same as those discussed above for packed towers. When iron and manganese precipitation problems are anticipated, pretreatment would be required for their removal, to prevent accumulation of precipitates that may affect air diffuser performance.

Reverse osmosis (RO) can be used to effectively remove a number of substances from water. Small RO treatment units are available commercially for point-of-use treatment. RO units operate at pressures greater than those normally found in domestic systems. Generally, the small molecular size of VOCs result in their passing through RO membranes, and effective removal is not obtained. Even if effective separation could be achieved, disposal of the concentrate stream containing the VOCs removed would be a problem in this application because wastewater is disposed on-site, in septic systems. A promising

process using membrane technology is in development stages. This involves pumping water containing VOCs through hollow fiber RO membranes. The water remains in the hollow fiber tubes, while the VOCs pass through the membrane walls and are transferred to an air stream. Long-term use and membrane life expectancy have not been investigated. At this stage this is considered a developing technology.

Adsorption can be effective in VOC removal. Granular activated carbon (GAC) in columns is generally used because of efficient adsorbent use and relatively low carbon cost. Carbon can remove many VOCs to non-detectable concentrations until the carbon reaches equilibrium capacity and contaminants appear in the effluent. Low VOC concentrations can be maintained even with fluctuating influent concentrations. Equipment is fairly readily available and can normally be employed at a reasonable cost. Pretreatment for iron and manganese removal, particulate removal or hardness reduction may be required.

Summary

In summary, stripping and carbon adsorption are the most viable options. Stripping is generally more effective than carbon in removing very low molecular size VOCs. If acceptable removal of the VOCs of concern at low concentrations using carbon adsorption can be demonstrated or predicted, carbon treatment would generally be preferable for removing VOCs. This is because consistent effluent quality can be maintained and the adsorption system is mechanically simpler than stripping systems.

Pilot Carbon System Study

A pilot study was conducted to test the effectiveness of GAC treatment for the application at hand. The equipment supplier indicated that a 30,000 gallon carbon change frequency would be anticipated for a GAC system consisting of three adsorbers in series, at a 10 gal/min flow rate. The supplier proposed a one-tenth scale study, consisting of three columns in series, operated at a flow rate of 1 gal/min for 3,000 gal. Each column contained 0.5 $ft^3$ of Filtrasorb 400 (Calgon Corporation) GAC, providing an empty bed contact time (EBCT) of 3.7 min for each column, which is similar to the EBCT anticipated for the full-scale equipment at a 10 gal/min flow rate.

The pilot GAC filter system study at the Schultz private well began on October 24, 1989 at 15:35 (3:35 p.m.). The GAC pilot system was set up by Hellenbrand Water Conditioners of Waunakee. The system was located at the Schultz well and the test was run with raw water from the well.

A flow rate of approximately 1 gal/min was run through the system continuously for 50 hours. Flow rate and total gallons were measured with an electric Autotrol Series 485 Multiflow Monitor/Controller. A mechanical meter, the Badger Recordall Model 15, was also used in the system to record total gallons of flow. The total volume from the Autotrol was 3218 gallons, while 2960 gallons were measured by the Badger Recordall. The discharge water was not used by the residents and was directed away from the house.

VOC sampling was initiated 8 hours after the system start-up and repeated at approximately 8-hour intervals for 50 hours. VOC samples were collected from the raw water and after the first, second, and third columns. The raw water and the sample taken after the first column were submitted for VOC analysis. The samples after the second and third columns were analyzed after it was determined that target compounds were detected in the first column effluent sample. The sample designations, sample dates/times and total gallons of flow are summarized in Table 6.

All VOC samples were preserved with four drops of 1+1 HCl and put on ice immediately after collection. Three duplicates were collected, maintaining a 1 duplicate per 10 samples ratio. Sample custody was maintained by Warzyn at all times, and samples were hand-delivered to the Warzyn analytical laboratory. Sample sets were collected beginning with the sample after the third column and ending with the raw water. The flow rate and total gallons of flow were recorded at each sampling event. No flow rate adjustments were made during the 50-hour run of this system.

Laboratory reports for the VOC analyses are provided in Appendix B. Analytical results for VOCs detected are summarized in Table 7. Dichlorodifluoromethane and an unknown substance were detected in the raw

water and in the Column 1 effluent in the first influent-effluent sample pair after 563 gal. No other identified VOCs were detected in the Column 1 effluent. Dichlorodifluoromethane and the unknown substance were detected in the Column 2 effluent after 1960 gal.

The pilot system was a one-tenth scale system in terms of flow rates and contaminant loading. Based on the pilot system results, it would therefore be anticipated that dichlorodifluoromethane and the unknown substance would break through Column 2 after approximately 20,000 gal of water treated, and that the other VOCs detected in the raw water would not be detected in the Column 1 effluent after approximately 30,000 gal of water treated. It is intended that this information will be used to determine carbon column requirements and a replacement schedule.

④ Break Through Times

Treatment Recommendations

Treatment for VOC removal using GAC is recommended for all three residences with media replacement at appropriate intervals. Auxiliary treatment for iron and manganese concentration reduction is recommended for the Stoppleworth residence only. This may be accomplished using the existing iron filter (after rebedding and suitable maintenance). If this is not feasible, the next most straightforward option would be use of the existing softening units for ion exchange removal of iron and manganese. Auxiliary treatment for hardness removal in connection with protecting carbon beds is not considered necessary at any of the three residences. Providing filtration for particulate removal ahead of all treatment units is also recommended.

① GAC for 3 homes

② Fe, Mn removal for Stoppleworth

③ No $CaCO_3$ Removal needed

④ Filter particulates

Agency Approval Applications

Three reviews by state agencies are required in connection with providing POE treatment at the three residences: (1) a plumbing product review by DILHR, (2) a review of the treatment system by the WDNR, and (3) a plumbing plan review by DILHR.

Plumbing Product Approval Application (DILHR)

Beside the Spark-L-Pure units discussed previously, there are no plumbing products currently approved for use in removing VOCs from water under

conditions appropriate for POE private water supply treatment. A number of equipment suppliers were contacted to identify those with suitable products that may be used to implement treatment recommendations. A vendor having a suitable product was identified, and provided product information to support a DILHR plumbing product review. As indicated above, a pilot study was conducted to determine the effectiveness of GAC treatment in this application. Pilot study results and basic product information are provided in this report to support a plumbing product review by DILHR. The DILHR application materials for this review are provided in Appendix C.

Private Water Supply Treatment Application (WDNR)

Review of the proposed treatment systems by the Bureau of Water Supply of the WDNR is required. Specific information for WDNR review applications are provided in Appendix D for the Schultz, Stoppleworth and Swanson (Wallin) private water supplies.

Plumbing Plan Review Application (DILHR)

Plans will be submitted following DILHR product approval and after WDNR inspection of the existing private systems for NR 112 compliance.

[jlv-601-39b]

# SECTION 3
# CONCLUSION

## Conclusions

We have drawn the following general conclusions based on the information obtained and interpretations made under the POE assessment project subtask:

- Volatile organic compounds are present in private water supply source water at the Schultz, Stoppleworth and Swanson properties. Several of the VOCs detected are of concern from a health standpoint, and at least one unknown substance was reported in several samples.
- Characterization of raw water quality, in terms of conventional parameters, indicates that iron and manganese concentrations in the Stoppleworth supply may cause problems with treatment devices due to the formation of insoluble oxides. No other characteristics that would require treatment were identified.
- Granular activated carbon treatment would effectively reduce VOC concentrations to less than detectable levels, with a suitable carbon quantity and system maintenance. Pilot study results indicate that carbon change frequencies on the order of 15,000 gal or more can be obtained with the equipment under consideration.

## Summary of Recommendations

Based on the raw water characterization at the Schultz, Stoppleworth and Swanson (Wallin) residences, treatment for VOC removal is recommended at all three residences. Pilot study results indicate that POE granular activated carbon treatment would be effective in removing the VOCs detected in the raw water. Specific recommendations for each residence are summarized below.

### Schultz

Pretreatment for particulate removal is recommended. A three-column-in-series GAC treatment system is recommended. Each column would be a Hellenbrand Model POE-VOC-GAC-14, containing virgin Filtrasorb 400 (Calgon Corporation) granular activated carbon. Considering the early breakthrough observed during the pilot test, the first two columns would be used for VOC removal and the third column would be used as a backup unit. A carbon charge frequency should be established based on system monitoring. The WDNR will establish specific monitoring requirements. At a minimum, raw water and Column 2 effluent monitoring at 5,000 gallon intervals is suggested.

Stoppleworth

Pretreatment for particulate removal is recommended. Iron and manganese removal is required. It is recommended that the existing iron filter be rebedded and used for this pretreatment. Considering that the VOCs detected in the raw water are similar to those detected at the Schultz residence (including an early eluting unknown), a three-column system is also recommended at the Stoppleworth residence. Monitoring considerations are similar to those discussed for the Schultz residence.

Swanson (Wallin)

Pretreatment for particulate removal is recommended. Only tetrachloroethene was detected, at a very low concentration. No breakthrough of tetrachloroethene was observed during the pilot test. A two-column system is recommended for the Swanson property. The first unit would provide VOC removal and the second would function as a backup. The WDNR will establish specific monitoring requirements. At a minimum, raw water and Column 1 effluent monitoring at 5,000 gal intervals is suggested.

Maintenance

For all systems, spent carbon will be disposed at an approved, clay-lined landfill equipped with a leachate collection system. The WDNR has indicated that the Dane County-Rodefeld Landfill is acceptable. System installation, monitoring and maintenance will be provided by Warzyn and its subcontractors for a period of six months. } ✓ contract

[jlv-601-39c]

WARZYN

## SECTION 4

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RLM/jlv/STS/JVS/WB
[jlv-601-39d]
13928.10

Table 1

Summary of VOCs Detected:
Spark-L-Pure Units

Description

| Identification | Schultz | | | | | Stoppleworth | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date[1] | 8/1 | 8/1 | 9/27 | 9/27 | 9/27 | 8/1 | 8/1 | 9/27 | 9/27 | 9/27 |
| Sample Location[2] | Raw | No. 1 | Raw | No. 1 | No. 2 | Raw | No. 1 | Raw | No. 1 | No. 2 |
| Cumulative Volume Treated[3] | 1086 | 1086 | 8700 | 8700 | 8700 | 1379 | 1379 | 10826 | 10826 | 10826 |
| 1,1-Dichloroethane | 4.4 | <1.0 | 4.6 | 2.6 | <1.0 | 3.0 | <1.0 | 3.0 | <1.0 | <1.0 |
| cis-1,2-Dichloroethene | 30 | <1.0 | 35 | 20 | 3.5 | 11 | 1.2 | 10 | <1.0 | <1.0 |
| Tetrachloroethene | 17 | <1.0 | 22 | 12 | 1.9 | 17 | 1.5 | 19 | <1.0 | <1.0 |
| Trichloroethene | 9.5 | <1.0 | 10 | 6.1 | 1.2 | 3.5 | <1.0 | 3.3 | <1.0 | <1.0 |
| Trichlorofluoromethane | 8.0 | <1.0 | 13 | 15 | 12 | 7.6 | 4.2 | 12 | 18 | 12 |

Notes

1 Samples were collected and analyzed by WDNR in 1989.

2 Raw refers to a sample location before the first Spark-L-Pure unit. No. 1 refers to a sample lcoation after the first Spark-L-Pure unit, and No. 2 refers to a sample location after the second Spark-L-Pure unit.

3 Cumulative Water Volume treated (in gallons) after installation of the Spark-L-Pure units.

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Table 2

Summary of Conventional Parameters Analyses

| Description | Units | Schultz Raw | Stoppleworth Raw | Stoppleworth Raw Dupl. | Swanson (Wallin) Raw |
|---|---|---|---|---|---|
| pH* | Std. Units | 6.9 | 7.1 | 7.1 | 7.0 |
| Conductivity (25°C)* | umho/cm | 700 | 620 | 620 | 720 |
| Alkalinity | mg $CaCO_3$/L | 368 | 352 | 352 | 299 |
| Chloride | mg/L | 9 | 5 | 5 | 26 |
| Nitrate Nitrogen | mg/L | 1.17 | 0.68 | 0.67 | 7.55 |
| Sulfate | mg/L | <5 | <5 | <5 | 29 |
| Total Organic Carbon | mg/L | <1.0 | <1.0 | <1.0 | <1.0 |
| Calcium | mg/L | 82.2 | 78.4 | 79.2 | 75.0 |
| Iron | mg/L | <0.02 | 4.88 | 4.59 | 0.05 |
| Magnesium | mg/L | 43.8 | 42.2 | 42.3 | 41.4 |
| Manganese | mg/L | <0.01 | 0.16 | 0.17 | <0.01 |
| Potassium | mg/L | 0.93 | 1.24 | 1.28 | 1.08 |
| Sodium | mg/L | 4.3 | 3.4 | 3.3 | 15.0 |
| Fecal Coliforms | colonies/100 mL | 0 | 0 | 0 | 0 |
| Total Coliforms | colonies/100 mL | 0 | 0 | 0 | 0 |
| Fecal Streptococcus (Strep) | colonies/100 mL | 0 | 100** | 0** | 21** |

Notes

* pH and conductivity were determined in the field.

** Results were considered inconclusive after comparing data from duplicate samples. Stoppleworth and Swanson (Wallin) supplies were resampled on October 11, 1989. No coliform or strep colonies were detected in these samples.

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Table 3

Summary of VOCs Detected: Schultz Residence

| Laboratory | Warzyn | Warzyn* | Warzyn** | SLH | SLH |
|---|---|---|---|---|---|
| Sampling Date | 9/21/89 | 10/4/89 | 10/24/89 | 8/1/89 | 9/27/89 |
| n-Butylbenzene | BMDL | <0.500 | <0.500 | ND | ND |
| Dichlorodifluoromethane | 9.85 | 7.17 | 16.3 | ND | ND |
| 1,1-Dichloroethane | 3.60 | 2.91 | 3.16 | 4.4 | 4.6 |
| 1,2-Dichloroethane | BMDL | BMDL | <0.500 | <1.0 | <1.0 |
| cis-1,2-Dichloroethene | 25.6 | 19.6 | 22.8 | 30 | 35 |
| trans-1,2-Dichloroethene | BMDL | <0.500 | <0.500 | <1.0 | <1.0 |
| 1,2-Dichloropropane | 1.24 | 0.941 | 1.21 | <1.0 | <1.0 |
| Methylene chloride | 1.47 | <0.500 | <0.500 | <5.0 | <5.0 |
| Tetrachloroethene | 14.0 | 10.3 | 14.7 | 17 | 22 |
| 1,1,1-Trichloroethane | 0.566 | 0.513 | 0.579 | <1.0 | <1.0 |
| Trichloroethene | 7.54 | 5.78 | 6.6 | 9.5 | 10 |
| Trichlorofluoromethane | 0.856 | 0.947 | 1.14 | 8.0 | 13 |
| Toluene | BMDL | BMDL | <0.500 | <1.0 | <1.0 |
| Naphthalene | <0.500 | <0.500 | <0.500 | ND | ND |

does State Lab not separate these?

Notes

* Contained an unidentified compound - Possible halogenated unknown with retention time between chloroethane and trichlorofluoromethane.

** Contained an unidentified compounds - (1) one compound with retention time later than chloroethane and (2) one compound with retention time earlier than vinyl chloride.

BMDL Below method detection limit. Detected, but concentration is less than the method limit of quantification.

ND Not determined

SLH State Laboratory of Hygiene

RLM/jlv/STS
[skb-401-86c]
13928.10

Table 4

Summary of VOCs Detected: Stoppleworth Residence

| Laboratory | Warzyn | Warzyn | Warzyn* | Warzyn* | SLH | SLH |
|---|---|---|---|---|---|---|
| Sampling Date | 9/21/89 | 9/21/89 Dup | 10/4/89 | 10/4/89 Dup | 8/1/89 | 9/27/89 |
| Dichlorodifluoromethane | 8.07 | 5.94 | 7.32 | 7.63 | ND | ND |
| 1,1-Dichloroethane | 2.39 | 2.30 | 2.56 | 2.79 | 3.0 | 3.0 |
| cis-1,2-Dichloroethene | 9.19 | 8.95 | 8.82 | 9.52 | 11 | 10 |
| trans-1,2-Dichloroethene | BMDL | BMDL | <0.500 | <0.500 | <1.0 | <1.0 |
| 1,2-Dichloropropane | BMDL | BMDL | BMDL | BMDL | <1.0 | <1.0 |
| Methylene Chloride | 0.791 | 1.65 | 0.888 | 0.933 | <5.0 | <5.0 |
| Tetrachloroethene | 13.9 | 9.85 | 14.1 | 17.9 | 17 | 19 |
| 1,1,1-Trichloroethane | 0.561 | 0.535 | 0.619 | 0.692 | <1.0 | <1.0 |
| Trichloroethene | 2.39 | 2.19 | 2.04 | 1.89 | 3.5 | 3.3 |
| Trichlorofluoromethane | 0.873 | 0.804 | 1.14 | 1.28 | 7.6 | 12 |
| Toluene | <0.500 | <0.500 | BMDL | BMDL | <1.0 | <1.0 |
| Naphthalene | <0.500 | <0.500 | 0.562 | | ND | ND |

Notes

* Contained an unidentified compound - Possible halogenated unknown with retention time between chloroethane and trichlorofluoromethane

BMDL Below method detection limit. Detected, but concentration is less than the method limit of quantification.

ND Not determined

SLH State Laboratory of Hygiene

RLM/jlv/STS
[skb-401-86d]
13928.10

Table 5

Summary of VOCs Detected: Swanson (Wallin) Residence

| Laboratory | Warzyn | Warzyn | SLH |
|---|---|---|---|
| Sampling Date | 9/21/89 | 10/4/89 | 3/22/88 |
| cis-1,2-Dichloroethene | <0.500 | <0.500 | 1.2 |
| Tetrachloroethene | 0.544 | 0.613 | 2.8 |
| Trichloroflouromethane | <0.500 | <0.500 | 1.1 |
| Toluene | <0.500 | BMDL | <1.0 |

Notes

BMDL Below Method Detection Limit. Detected, but concentration is less than the method limit of quantification.

ND Not determined.

SLH State Laboratory of Hygiene

RLM/jlv/STS
[skb-401-86e]
13928.10

## Table 6

## Pilot Study Sample and Meter Reading Summary

| Sample Designation | Sample Date/Time | Total Gallons (Autotrol)[2] |
|---|---|---|
| Schultz - 1 | 10-24-89 / 23:45 | 563 |
| Schultz - 1.1 | 10-24-89 / 23:40 | 563 |
| Schultz - 1.2 | 10-24-89 / 23:35 | 563 |
| Schultz - 1.3 | 10-24-89 / 23:30 | 563 |
| Schultz - 1 dup | 10-24-89 / 23:50 | 563 |
| Schultz - 2 | 10-25-89 / 07:36 | 987 |
| Schultz - 2.1 | 10-25-89 / 07:34 | 987 |
| Schultz - 2.2 | 10-25-89 / 07:32 | 987 |
| Schultz - 2.3 | 10-25-89 / 07:30 | 987 |
| Schultz - 3 | 10-25-89 / 15:38 | 1470 |
| Schultz - 3.1 | 10-25-89 / 15:36 | 1470 |
| Schultz - 3.2 | 10-25-89 / 15:34 | 1470 |
| Schultz - 3.3 | 10-25-89 / 15:32 | 1470 |
| Schultz - 3.3 dup | 10-25-89 / 15:30 | 1470 |
| Schultz - 4 | 10-25-89 / 23:40 | 1960 |
| Schultz - 4.1 | 10-25-89 / 23:35 | 1960 |
| Schultz - 4.2 | 10-25-89 / 23:30 | 1960 |
| Schultz - 4.3 | 10-25-89 / 23:25 | 1960 |
| Schultz - 5 | 10-26-89 / 08:36 | 2578 |
| Schultz - 5.1 | 10-26-89 / 08:34 | 2578 |
| Schultz - 5.2 | 10-26-89 / 08:32 | 2578 |
| Schultz - 5.3 | 10-26-89 / 08:30 | 2578 |
| Schultz - 6 | 10-26-89 / 17:41 | 3218 |
| Schultz - 6.1 | 10-26-89 / 17:39 | 3218 |
| Schultz - 6.2 | 10-26-89 / 17:37 | 3218 |
| Schultz - 6.3 | 10-26-89 / 17:35 | 3218 |
| Schultz - 6.1 dup | 10-26-89 / 17:39 | 3218 |

Notes

1. The sample designations are as follows: "Schultz - 1" = Schultz well, first sampling event; raw water. "Schultz - 1.1" = Schultz well, sampling event 1, after first filter. "Schultz - 2.3" = Schultz well, sampling event 2, after the third filter.

2. "Autotrol" indicates the cumulative volume reading from an Autotrol series 485 Multiflow Monitor/Controller.

RLM/jlv/STS
[skb-401-86]

# Table 7

## Pilot Carbon System Test Results

DICHLORODIFLUOROMETHANE

| Date | Time | gal | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 563 | 16.2 | 3.10 | < 1.00 | < 1.00 | |
| 10/25 | 07:30 | 987 | 14.8 | 3.86 | < 1.00 | < 1.00 | |
| 10/25 | 15:30 | 1470 | 7.99 | 5.05 | < 1.00 | < 1.00 | |
| 10/25 | 23:25 | 1960 | 7.29 | 7.42 | 4.58 | < 1.00 | Break Through @ 20,000 gal |
| 10/26 | 08:30 | 2570 | 7.14 | 7.49 | 5.10 | 4.68 | |
| 10/26 | 17:35 | 3218 | 7.85 | 3.08 | 4.83 | 4.76 | No ES |

1,1-DICHLOROETHANE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 3.11 | < 0.50 | < 0.50 | < 0.50 | No breakthrough |
| 10/25 | 07:30 | 3.00 | < 0.50 | < 0.50 | < 0.50 | ES = 850 ug/L |
| 10/25 | 15:30 | 3.27 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 23:25 | 3.30 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 3.10 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 3.13 | < 0.50 | < 0.50 | < 0.50 | |

cis-1,2-DICHLOROETHENE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 25.2 | < 0.50 | < 0.50 | < 0.50 | No breakthrough |
| 10/25 | 07:30 | 25.4 | < 0.50 | < 0.50 | < 0.50 | ES = 100 ug/L |
| 10/25 | 15:30 | 24.1 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 23:25 | 25.6 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 27.4 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 23.4 | < 0.50 | < 0.50 | < 0.50 | |

Table 7 (continued)

1,2-DICHLOROPROPANE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 1.16 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 07:30 | 1.11 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 15:30 | 1.09 | < 0.50 | < 0.50 | < 0.50 | No Breakthrough |
| 10/25 | 23:25 | 1.20 | < 0.50 | < 0.50 | < 0.50 | No ES |
| 10/26 | 08:30 | 1.12 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 1.15 | < 0.50 | < 0.50 | < 0.50 | |

TETRACHLOROETHENE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 13.6 | < 0.50 | < 0.50 | < 0.50 | No Breakthrough |
| 10/25 | 07:30 | 11.4 | < 0.50 | < 0.50 | < 0.50 | ES = 1 ug/l |
| 10/25 | 15:30 | 13.4 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 23:25 | 16.6 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 10.9 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 14.7 | < 0.50 | < 0.50 | < 0.50 | |

1,1,1-TRICHLOROETHANE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 0.572 | < 0.50 | < 0.50 | < 0.50 | No Breakthrough |
| 10/25 | 07:30 | 0.519 | < 0.50 | < 0.50 | < 0.50 | ES = 200 ug/l |
| 10/25 | 15:30 | < 0.500 | < 0.50 | < 0.50 | < 0.50 | RMCL = 200 ug/l |
| 10/25 | 23:25 | 0.532 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | < 0.500 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 0.532 | < 0.50 | < 0.50 | < 0.50 | |

Table 7 (continued)

TRICHLOROETHENE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 6.36 | < 0.50 | < 0.50 | < 0.50 | No Break Through |
| 10/25 | 07:30 | 5.46 | < 0.50 | < 0.50 | < 0.50 | ES = 1.8 mg/l |
| 10/25 | 15:30 | 6.11 | < 0.50 | < 0.50 | < 0.50 | RMCL = 0 |
| 10/25 | 23:25 | 7.18 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 5.48 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 6.59 | < 0.50 | < 0.50 | < 0.50 | |

TRICHLOROFLUOROMETHANE

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 1.10 | < 0.50 | < 0.50 | < 0.50 | No Break Through |
| 10/25 | 07:30 | 1.00 | < 0.50 | < 0.50 | < 0.50 | ES = 3490 mg/l |
| 10/25 | 15:30 | 1.10 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 23:25 | 1.21 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 1.10 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 1.17 | < 0.50 | < 0.50 | < 0.50 | |

UNKNOWN 1 (See Notes)

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | | - Start of Pilot Test - | | | |
| 10/24 | 23:30 | 23.2 | < 0.50 | < 0.50 | < 0.50 | No Break Through |
| 10/25 | 07:30 | 24.2 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 15:30 | 26.0 | < 0.50 | < 0.50 | < 0.50 | |
| 10/25 | 23:25 | 21.6 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 08:30 | 26.8 | < 0.50 | < 0.50 | < 0.50 | |
| 10/26 | 17:35 | 20.9 | < 0.50 | < 0.50 | < 0.50 | |

Table 7 (continued)

UNKNOWN 2 (See Notes)

| Date | Time | Influent Conc., ug/L | After 1st GAC Unit Conc., ug/L | After 2nd GAC Unit Conc., ug/L | After 3rd GAC Unit Conc., ug/L | |
|---|---|---|---|---|---|---|
| 10/24 | 15:35 | gal | | - Start of Pilot Test - | | |
| 10/24 | 23:30 | 563 | 0.712 | BMDL | < 0.500 | < 0.500 |
| 10/25 | 07:30 | 987 | 0.771 | BMDL | < 0.500 | < 0.500 |
| 10/25 | 15:30 | 1470 | 0.813 | BMDL | < 0.500 | < 0.500 |
| 10/25 | 23:25 | 1960 | 0.600 | 0.800 | BMDL | BMDL |
| 10/26 | 08:30 | 2570 | 0.814 | 0.754 | 0.523 | 0.632 |
| 10/26 | 17:35 | 3218 | 0.653 | 0.530 | BMDL | 0.680 |

Break Through - 20,000 gal

NOTES:

< Analyzed, but not detected.

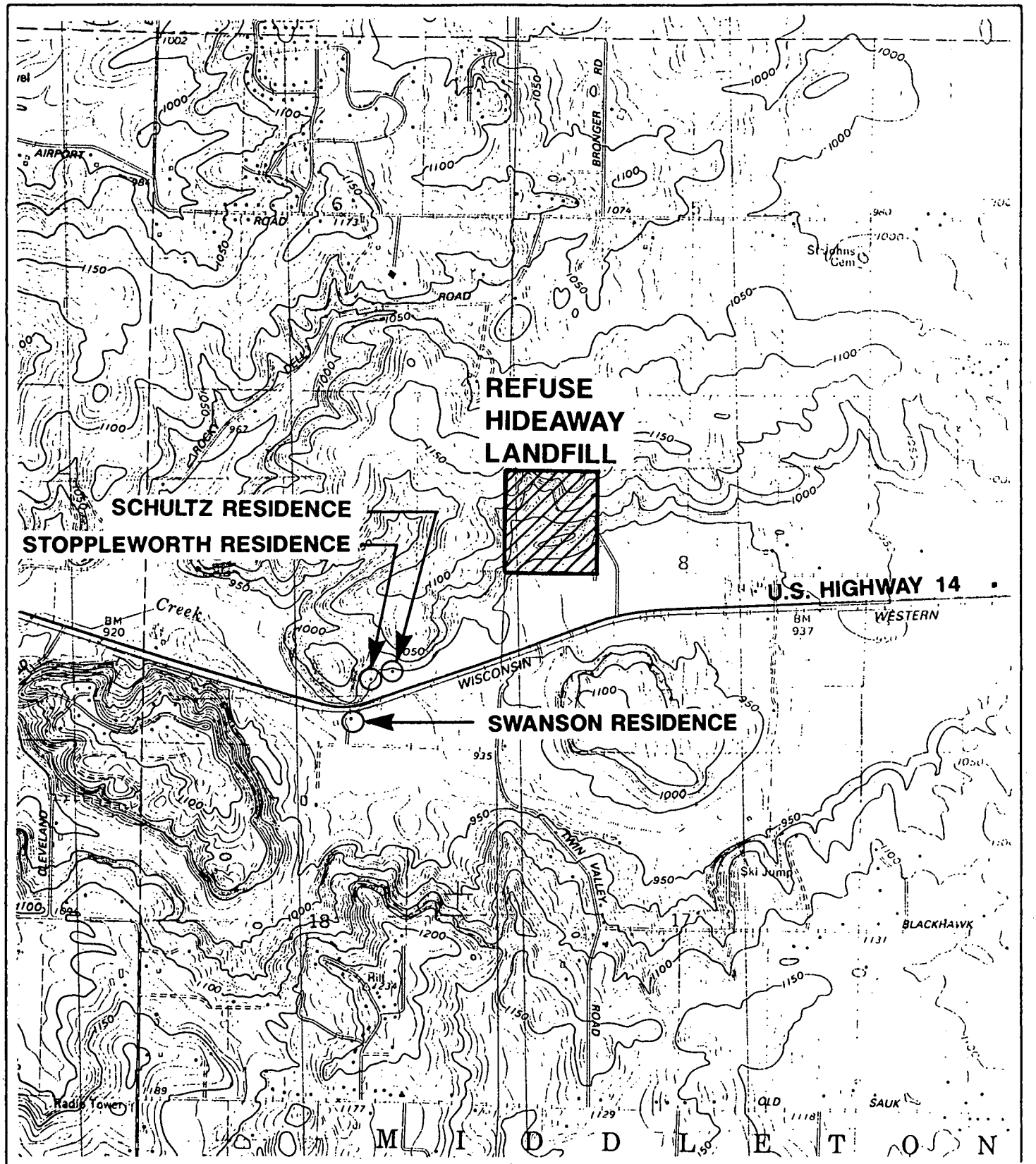
BMDL Below Method Detection Limits. Detected, but concentration is less than method limit of quantification.

UNKNOWN 1 Compound that elutes off the gas chromatograph with a retention time later than chloroethane. Concentrations were estimated using the internal standard response factor.

UNKNOWN 2 Compound that elutes off the gas chromatograph with a retention time earlier than vinyl chloride. Concentrations were estimated using the internal standard response factor.

Method Reference: EPA, "Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

MAL/jlv/RLM
[skb-401-86f]
13928.10




## NOTE

1. BASE MAP DEVELOPED FROM THE MIDDLETON, WISCONSIN 7 1/2 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP DATED 1962, PHOTOREVISED 1969.

north

0 2000 4000

SCALE IN FEET

| DWN JC | APP'D STS | DATE 11/20/89 | 13928 | A1 |
|---|---|---|---|---|

WARZYN

**SITE LOCATION MAP**

POINT-OF-ENTRY TREATMENT
INTERIM REMEDIAL MEASURES
REFUSE HIDEAWAY LANDFILL
TOWN OF MIDDLETON
DANE COUNTY, WISCONSIN

TELEDYNE ROST N67178

# Appendix A

## Analytical Laboratory Results
## Raw Water Characterization

WARZYN ENGINEERING INC. • ONE SCIENCE COURT • UNIVERSITY RESEARCH PARK • P.O. BOX 5385 • MADISON, WISCONSIN 53705 • (608) 273-0440

WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37287
SAMPLE ID: SCHULTZ RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: RJS
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | BMDL |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 9.85 |
| 1,1-Dichloroethane | 0.500 | 3.60 |
| 1,2-Dichloroethane | 0.500 | BMDL |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 25.6 |
| trans-1,2-Dichloroethene | 0.500 | BMDL |
| 1,2-Dichloropropane | 0.500 | 1.24 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | 1.47 |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37287
SAMPLE ID: SCHULTZ RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: DJE
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 14.0 |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.566 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 7.54 |
| Trichlorofluoromethane | 0.500 | 0.856 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37288
SAMPLE ID: STOPPLEWORTH RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: D/E
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 8.07 |
| 1,1-Dichloroethane | 0.500 | 2.39 |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 9.19 |
| trans-1,2-Dichloroethene | 0.500 | BMDL |
| 1,2-Dichloropropane | 0.500 | BMDL |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | 0.791 |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37288
SAMPLE ID: STOPPLEWORTH RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: DAE
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 13.9 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.561 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 2.39 |
| Trichlorofluoromethane | 0.500 | 0.873 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37289
SAMPLE ID: STOPPLEWORTH RAW DUPLICATE

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: PAE
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 5.94 |
| 1,1-Dichloroethane | 0.500 | 2.30 |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 8.95 |
| trans-1,2-Dichloroethene | 0.500 | BMDL |
| 1,2-Dichloropropane | 0.500 | BMDL |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | 1.65 |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37289
SAMPLE ID: STOPPLEWORTH RAW DUPLICATE

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: DAE
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 9.85 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.535 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 2.19 |
| Trichlorofluoromethane | 0.500 | 0.804 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37290
SAMPLE ID: WALLIN RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: DJS
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37290
SAMPLE ID: WALLIN RAW

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: D/C
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 0.544 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37291
SAMPLE ID: TRIP BLANK

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: D/E
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 37291
SAMPLE ID: TRIP BLANK

PROJECT #: 13928.10
DATE SAMPLED: 9/21/89
CK'D: BJC APP'D: DJE
DATE ISSUED: 10/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | BMDL |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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# ANALYTICAL LABORATORY RESULTS
WI LAB CERTIFICATION ID#: 113138300

PROJECT: REFUSE HIDEAWAY

LOCATION: MIDDLETON, WISCONSIN

PROJECT #: 13928.10
DATE SAMPLED: 09/21/89
CK'D: BJC APP'D: JWW
DATE ISSUED: 10/4/89

| LAB NO. / SAMPLE DESCRIPTION | 37287 SCHULTZ RAW | 37288 STOPPLEWORTH RAW | 37289 STOPPLEWORTH RAW DUPLICATE | 37290 WALLIN RAW |
|---|---|---|---|---|
| ALKALINITY | 368 | 352 | 352 | 299 |
| CHLORIDE | 9 | 5 | 5 | 26 |
| NITRATE NITROGEN | 1.17 | 0.68 | 0.67 | 7.55 |
| SULFATE | <5* | <5* | <5* | 29 |
| TOTAL ORGANIC CARBON | <1.0 | <1.0 | <1.0 | <1.0 |
| CALCIUM | 82.2 | 78.4 | 79.2 | 75.0 |
| IRON | <0.02 | 4.88 | 4.59 | 0.05 |
| MAGNESIUM | 43.8 | 42.2 | 42.3 | 41.4 |
| MANGANESE | <0.01 | 0.16 | 0.17 | <0.01 |
| POTASSIUM | 0.93 | 1.24 | 1.28 | 1.08 |
| SODIUM | 4.3 | 3.4 | 3.3 | 15.0 |
| FECAL COLIFORMS (/100 ML) | 0 | 0 | 0 | 0 |
| TOTAL COLIFORMS (/100 ML) | 0 | 0 | 0 | 0 |
| FECAL STREP (/100 ML) | 0 | 100 | 0 | 21 |

RESULTS ARE REPORTED IN MG/L UNLESS OTHERWISE STATED.

* ELEVATED DETECTION LIMIT DUE TO DILUTION NECESSARY TO OVERCOME INTERFERENCE.

METHOD REFERENCE: EPA-600, "METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES", MARCH, 1984.

WARZYN

Warzyn Engineering Inc.
[redacted]ence [redacted]
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME | NO. OF CONTAINERS | Na, K, Ca, Mg, Fe, Mn 500mL HNO3 | Cl, SO4, NO3-N, Alk 250cc | TOC 250 mL H2SO4 pH<2 | VOC Vial HCl pH<2 | Bact. Tot Col Fec Col Free Chlor Strips | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13928.10 | LOCATION: MIDDLETON, WI | | | | | | | |
| SAMPLERS: (Signature) Robert L Mumford | | | | | | | | |

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37287 | 9/21/89 | 9:30 | | X | Schultz - Raw | ~~6~~ 7 | 1 | 1 | 1 | 2 | 2 | | |
| 37288 | 9/21/89 | 10:15 | | X | Stoppleworth - Raw | 7 | 1 | 1 | 1 | 2 | 2 | | |
| 37289 | 9/21/89 | 10:15 | | X | Stoppleworth - Raw - Dupl | 7 | 1 | 1 | 1 | 2 | 2 | | |
| 37290 | 9/21/89 | 11:15 | | X | Wallin - Raw | 7 | 1 | 1 | 1 | 2 | 2 | | |
| 37291 | 9/21/89 | 9:00 | | X | Trip Blank | 2 | | | | 2 | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Robert L Mumford | 9/21/89 1:05 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kathleen A Walsh | | 9/21/89 1:15 p.m. | |

Remarks

Samples received cold and intact.

Note: Necessary bottles were not preserved to ph < 2.
Did so in lab on 9-21-89

PROJECT MANAGER: J. Schlittner

6934

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

№ 9 01107

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# ANALYTICAL LABORATORY RESULTS
WI LAB CERTIFICATION ID#: 113138300

PROJECT: REFUSE HIDEAWAY

LOCATION: MIDDLETON, WISCONSIN

PROJECT #: 13928.10
DATE SAMPLED: 10/11/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 10/20/89

| LAB NO. | 38296 | 38297 |
|---|---|---|
| SAMPLE DESCRIPTION | STOPPLEWORTH | WALLINS |
| TOTAL COLIFORMS (/100 ML) | <1 | <1 |
| FECAL COLIFORMS (/100 ML) | <1 | <1 |
| FECAL STREP (/100 ML) | <1 | <1 |

WARZYN

[redacted]zyn En[redacted]ing In[redacted]
One Science Court
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10 | PROJECT NAME Refuse Hdwy | LOCATION: Middleton, WI

SAMPLERS: (Signature) Brian Hegge

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | V. Coliform | Fecal Coliform | Fecal Strep | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | GW |
| 38296 | 10/11/89 | 1250 | | ✓ | Stoppelworth | 3 | ✓ | ✓ | ✓ | | | | |
| | | | | | | | | | | | | | |
| 38297 | 10/11/89 | 1310 ~~1250~~ | | ✓ | Wallins | 3 | ✓ | ✓ | ✓ | | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Brian Hegge | 10/11/89 1340 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari-Ann Link | | 1:45 pm | |

Remarks

PROJECT MANAGER: T. Mitka

7019

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

No. 8 3660

WARZYN

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October 24, 1989

**MEMORANDUM**

**RE:** C# 13928.20 - Refuse Hideaway

Samples 38135, 38136, and 38137 contain what appears to be an early eluting halogenated unknown. This unknowns' retention time,eluting off the gas chromatograph,is consistant and falls between Chloroethane and Trichlorofluoromethane. The estimated concentration of the unknowns, calculated against the internal standard 1-Chloro-2-Fluorobenzene is 24.2, 19.7, and 26.8 ug/L, respectively.

Daniel J. Elwood

Organic Chemistry Supervisor

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38135
SAMPLE ID: AL STOPPLEWORTH

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JPH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.32 |
| 1,1-Dichloroethane | 0.500 | 2.56 |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 8.82 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | BMDL |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | 0.888 |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38135
SAMPLE ID: AL STOPPLEWORTH

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DAC
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | 0.562 |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 14.1 |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.619 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 2.04 |
| Trichlorofluoromethane | 0.500 | 1.14 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38136
SAMPLE ID: AL STOPPLEWORTH DUP

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.63 |
| 1,1-Dichloroethane | 0.500 | 2.79 |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 9.52 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | BMDL |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | 0.933 |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38136
SAMPLE ID: AL STOPPLEWORTH DUP

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 17.9 |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.692 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 1.89 |
| Trichlorofluoromethane | 0.500 | 1.28 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38137
SAMPLE ID: CRAIG SCHULTZ

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DAE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.17 |
| 1,1-Dichloroethane | 0.500 | 2.91 |
| **1,2-Dichloroethane** | 0.500 | BMDL |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 19.6 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 0.941 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38137
SAMPLE ID: CRAIG SCHULTZ

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 10.3 |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.513 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 5.78 |
| Trichlorofluoromethane | 0.500 | 0.957 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38138
SAMPLE ID: SUNNYSIDE SEED

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38138
SAMPLE ID: SUNNYSIDE SEED

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JPH APP'D: DAE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 0.613 |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38154
SAMPLE ID: TRIP BLANK

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| **Benzene** | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| **Carbon tetrachloride** | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| **1,4-Dichlorobenzene** | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| **1,2-Dichloroethane** | 0.500 | |
| **1,1-Dichloroethene** | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38154
SAMPLE ID: TRIP BLANK

PROJECT #: 13928.20
DATE SAMPLED: 10/4/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 10/24/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA Method 502.2 (with modifications).

Warzyn Engineering Inc.
[redacted]
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.20

PROJECT NAME: Refuse Hideaway Landfill

LOCATION: Middleton, WI

SAMPLERS: (Signature) Thomas J. Dunkel

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOC's | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Tag # GW |
| 38154 | 10/4/89 | 0715 | | X | Trip Blank | 1 | ✓ | | | | | | 7-08068 |
| 38135 | | 0820 | | X | Al Stoppleworth | 2 | ✓ | | | | | | 7-08069, 070 |
| 38136 | | 0820 | | X | Al Stoppleworth DUP | 2 | ✓ | | | | | | 7-08071, 072 |
| 38137 | | 0830 | | X | Craig Schultz | 2 | ✓ | | | | | | 7-08073, 074 |
| 38138 | | 0855 | | X | Sunnyside Seed | 2 | ✓ | | | | | | 7-08075 076 |
| 38139 | | 0955 | | X | Eunice Schulenburg | 2 | ✓ | | | | | | 7-08376, 377 |
| 38140 | | 1025 | | X | John Benson | 2 | ✓ | | | | | | 7-08378, 379 |
| 38141 | | 1105 | | X | Mary Bula | 2 | ✓ | | | | | | 7-08380, 381 Vial w/air |
| 38142 | | 1105 | | X | Mary Bula DUP | 2 | ✓ | | | | | | 7-08382, 383 |
| 38143 | | 1300 | | X | Chalet St. Moritz | 2 | ✓ | | | | | | 7-08384, 385 |
| 38144 | | 1335 | | X | Pat Hansen | 2 | ✓ | | | | | | 7-08386, 387 |
| 38145 | | 1410 | | X | Charlie Bucsek | 2 | ✓ | | | | | | 7-08388, 389 |
| 38146 | | 1440 | | X | Gary Ehnert | 2 | ✓ | | | | | | 7-08390, 391 |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Thomas J. Dunkel | 10/4/89 2030 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari Ann Link | | 10/5/89 7:25am | |

Remarks

All VOC's preserved with 1:1 HCl.

PROJECT MANAGER: J. Schittone

6990

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

WF60813

№ 9 01115

Warzyn Engineering Inc.
[redacted]
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.20

PROJECT NAME: Refuse Hideaway Landfill

LOCATION: Middleton, WI

SAMPLERS: (Signature) Thomas J. Dunbleth

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOC's | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Tag # GW |
| 38147 | 10/4/89 | 1525 | | X | Elmer Jungbluth | 2 | ✓ | 7-08392, 393 |
| 38148 | | 1655 | | X | Patrick Coyle | 2 | ✓ | 7-08394, 395 |
| 38149 | | 1720 | | X | Gene Sharp | 2 | ✓ | 7-08396, 397 |
| 38150 | | 1755 | | X | Mike Root | 2 | ✓ | 7-08398, 399 |
| 38151 | | 1825 | | X | Ron Golesh | 2 | ✓ | 7-08400, 8-04001 |
| 38152 | | 1915 | | X | Don Julson | 2 | ✓ | 8-04002, 003 |
| 38153 | ↓ | 1955 | | X | Kathy Gerber | 2 | ✓ | 8-04004, 005 1 vial w/air |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Thomas A. Dunbleth | 10/4/89 2030 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari Ann Link | | 10/5/89 7:25 am | |

Remarks

All VOC's preserved with 1:1 HCl.

PROJECT MANAGER: J. Schittone

6990

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

WF 60413

№ 9 01116

# Appendix B

## Analytical Laboratory Results
## Pilot Carbon System

WARZYN ENGINEERING INC. • ONE SCIENCE COURT • UNIVERSITY RESEARCH PARK • P.O. BOX 5385 • MADISON, WISCONSIN 53705 • (608) 273-0440

WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38618
SAMPLE ID: SCHULTZ-1

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/1/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 16.3 |
| 1,1-Dichloroethane | 0.500 | 3.16 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 22.8 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.21 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38618
SAMPLE ID: SCHULTZ-1

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JRH APP'D: DJE
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 14.7 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.579 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 6.66 |
| Trichlorofluoromethane | 0.500 | 1.14 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38618 contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 22.6 ug/L.

(2) Sample 38618 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.699 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38620A
SAMPLE ID: SCHULTZ-1 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 16.0 |
| 1,1-Dichloroethane | 0.500 | 3.06 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 27.6 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.11 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38620A
SAMPLE ID: SCHULTZ-1 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 12.6 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.564 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 6.05 |
| Trichlorofluoromethane | 0.500 | 1.06 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38620A contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 23.9 ug/L.

(2) Sample 38620A contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.725 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38619A
SAMPLE ID: SCHULTZ-1.1

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JMH APP'D: DJS
DATE ISSUED: 11/16/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 3.10 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38619A
SAMPLE ID: SCHULTZ-1.1

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38619A contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39048
SAMPLE ID: SCHULTZ-1.2

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JMH APP'D: DJE
DATE ISSUED: 11/15/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39048
SAMPLE ID: SCHULTZ-1.2

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JRH APP'D: [illegible]
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39049
SAMPLE ID: SCHULTZ-1.3

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JRH APP'D: DJE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39049
SAMPLE ID: SCHULTZ-1.3

PROJECT #: 13928.10
DATE SAMPLED: 10/24/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38621A
SAMPLE ID: SCHULTZ-2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 14.8 |
| 1,1-Dichloroethane | 0.500 | 3.00 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 25.4 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.11 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38621A
SAMPLE ID: SCHULTZ-2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JRH APP'D: DJL
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 11.4 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.519 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 5.46 |
| Trichlorofluoromethane | 0.500 | 0.998 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38621A contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 24.2 ug/L.

(2) Sample 38621A contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.771 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38622A
SAMPLE ID: SCHULTZ-2.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/6/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 3.86 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38622A
SAMPLE ID: SCHULTZ-2.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JMH APP'D: KOC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38622A contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39050
SAMPLE ID: SCHULTZ-2.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/3/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39050
SAMPLE ID: SCHULTZ-2.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DAE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39051
SAMPLE ID: SCHULTZ-2.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JTH APP'D: D/E
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 339051
SAMPLE ID: SCHULTZ-2.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38675
SAMPLE ID: SCHULTZ-3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JMH APP'D: DJE
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.99 |
| 1,1-Dichloroethane | 0.500 | 3.27 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 24.1 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.09 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38675
SAMPLE ID: SCHULTZ-3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DF
DATE ISSUED: 11/16/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 13.4 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | BMDL |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 6.11 |
| Trichlorofluoromethane | 0.500 | 1.10 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38675 contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 26.0 ug/L.

(2) Sample 38675 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.813 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38676
SAMPLE ID: SCHULTZ-3.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/10/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 5.05 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38676
SAMPLE ID: SCHULTZ-3.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38676 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39052
SAMPLE ID: SCHULTZ-3.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/17/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39052
SAMPLE ID: SCHULTZ-3.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39053
SAMPLE ID: SCHULTZ-3.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39053
SAMPLE ID: SCHULTZ-3.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39054
SAMPLE ID: SCHULTZ-3.3 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39054
SAMPLE ID: SCHULTZ-3.3 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JMH APP'D: DJE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38680
SAMPLE ID: SCHULTZ-4

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JMH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.29 |
| 1,1-Dichloroethane | 0.500 | 3.30 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 25.6 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.20 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38680
SAMPLE ID: SCHULTZ-4

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 16.6 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.532 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 7.18 |
| Trichlorofluoromethane | 0.500 | 1.21 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38680 contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 21.6 ug/L.

(2) Sample 38680 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.600 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38681
SAMPLE ID: SCHULTZ-4.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.42 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38681
SAMPLE ID: SCHULTZ-4.1

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JMH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38681 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.800 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39055
SAMPLE ID: SCHULTZ-4.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 11/15/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 4.58 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39055
SAMPLE ID: SCHULTZ-4.2

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DAE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39055 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39056
SAMPLE ID: SCHULTZ-4.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JAH APP'D: DJS
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39056
SAMPLE ID: SCHULTZ-4.3

PROJECT #: 13928.10
DATE SAMPLED: 10/25/89
CK'D: JRH APP'D: D/E
DATE ISSUED: 11/3/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39056 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38683
SAMPLE ID: SCHULTZ-5

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: KDE
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.14 |
| 1,1-Dichloroethane | 0.500 | 3.10 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 27.4 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.12 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38683
SAMPLE ID: SCHULTZ-5

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: KDE
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 10.9 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | BMDL |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 5.48 |
| Trichlorofluoromethane | 0.500 | 1.10 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38683 contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 26.8 ug/L.

(2) Sample 38683 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.814 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38684
SAMPLE ID: SCHULTZ-5.1

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: KDF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.49 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38684
SAMPLE ID: SCHULTZ-5.1

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: [illegible] APP'D: KDE
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38684 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.754 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39057
SAMPLE ID: SCHULTZ-5.2

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: MM APP'D: DJC
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 5.10 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39057
SAMPLE ID: SCHULTZ-5.2

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: DAE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39057 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.523 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39058
SAMPLE ID: SCHULTZ-5.3

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 4.68 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39058
SAMPLE ID: SCHULTZ-5.3

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39058 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.632 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38764
SAMPLE ID: SCHULTZ-6

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: TAH APP'D: KDC
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | (1) |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 7.85 |
| 1,1-Dichloroethane | 0.500 | 3.13 |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | 23.4 |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | 1.15 |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38764
SAMPLE ID: SCHULTZ-6

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JRH APP'D: KDF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | 14.7 |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | 0.532 |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | 6.59 |
| Trichlorofluoromethane | 0.500 | 1.17 |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 38764 contains a compound that elutes off of the gas chromatograph with a retention time later than chloroethane. The result, calculated using the internal standard response is 20.9 ug/L.

(2) Sample 38764 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.653 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38765
SAMPLE ID: SCHULTZ-6.1

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: KDF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 2.78 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38765
SAMPLE ID: SCHULTZ-6.1

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JRH APP'D: KOF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38765 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.530 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38766
SAMPLE ID: SCHULTZ-6.1 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: KDF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 3.39 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 38766
SAMPLE ID: SCHULTZ-6.1 DUP

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: AH APP'D: KDF
DATE ISSUED: 11-9-89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (2) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(2) Sample 38766 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.664 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39059
SAMPLE ID: SCHULTZ-6.2

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 4.83 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39059
SAMPLE ID: SCHULTZ-6.2

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: DAE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | BMDL |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39059 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is BMDL.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39060
SAMPLE ID: SCHULTZ-6.3

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: D/E
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Benzene | 0.500 | |
| Bromobenzene | 0.500 | |
| Bromochloromethane | 0.500 | |
| Bromodichloromethane | 0.500 | |
| Bromoform | 0.500 | |
| Bromomethane | 1.00 | |
| n-Butylbenzene | 0.500 | |
| sec-Butylbenzene | 0.500 | |
| tert-Butylbenzene | 0.500 | |
| Carbon tetrachloride | 0.500 | |
| Chlorobenzene | 0.500 | |
| Chloroethane | 0.500 | |
| Chloroform | 0.500 | |
| Chloromethane | 0.500 | |
| 2-Chlorotoluene | 0.500 | |
| 4-Chlorotoluene | 0.500 | |
| Dibromochloromethane | 0.500 | |
| 1,2-Dibromo-3-chloropropane | 1.00 | |
| 1,2-Dibromoethane | 0.500 | |
| Dibromomethane | 0.500 | |
| 1,2-Dichlorobenzene | 0.500 | |
| 1,3-Dichlorobenzene | 0.500 | |
| 1,4-Dichlorobenzene | 0.500 | |
| Dichlorodifluoromethane | 1.00 | 4.76 |
| 1,1-Dichloroethane | 0.500 | |
| 1,2-Dichloroethane | 0.500 | |
| 1,1-Dichloroethene | 0.500 | |
| cis-1,2-Dichloroethene | 0.500 | |
| trans-1,2-Dichloroethene | 0.500 | |
| 1,2-Dichloropropane | 0.500 | |
| 1,3-Dichloropropane | 0.500 | |
| 2,2-Dichloropropane | 0.500 | |
| 1,1-Dichloropropene | 0.500 | |
| Ethyl benzene | 0.500 | |
| Hexachlorobutadiene | 0.500 | |
| Isopropylbenzene | 0.500 | |
| p-Isopropyltoluene | 0.500 | |
| Methylene chloride | 0.500 | |

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WARZYN ENGINEERING INC.
WI LAB CERTIFICATION #: 113138300

PROJECT: REFUSE HIDEAWAY L.F. - PILOT CARBON SYSTEM
LOCATION: MIDDLETON, WISCONSIN
LAB NUMBER: 39060
SAMPLE ID: SCHULTZ-6.3

PROJECT #: 13928.10
DATE SAMPLED: 10/26/89
CK'D: JAH APP'D: DJE
DATE ISSUED: 11/13/89

| Compound (ug/L) | Limit of Quantitation | Result |
|---|---|---|
| Naphthalene | 0.500 | |
| n-Propylbenzene | 0.500 | |
| Styrene | 0.500 | |
| 1,1,1,2-Tetrachloroethane | 0.500 | |
| 1,1,2,2-Tetrachloroethane | 0.500 | |
| Tetrachloroethene | 0.500 | |
| Toluene | 0.500 | BMDL |
| 1,2,3-Trichlorobenzene | 0.500 | |
| 1,2,4-Trichlorobenzene | 0.500 | |
| 1,1,1-Trichloroethane | 0.500 | |
| 1,1,2-Trichloroethane | 0.500 | |
| Trichloroethene | 0.500 | |
| Trichlorofluoromethane | 0.500 | |
| 1,2,3-Trichloropropane | 0.500 | |
| 1,2,4-Trimethylbenzene | 0.500 | |
| 1,3,5-Trimethylbenzene | 0.500 | |
| Vinyl chloride | 0.500 | (1) |
| o-Xylene | 0.500 | |
| m+p-Xylene | 0.500 | |
| cis-1,3-Dichloropropene | 0.500 | |
| trans-1,3-Dichloropropene | 0.500 | |

BMDL - Detected, below limit of quantitation.
Blank - Analyzed, but not detected.

(1) Sample 39060 contains a compound that elutes off of the gas chromatograph with a retention time earlier than vinyl chloride. The result, calculated using the internal standard response is 0.680 ug/L.

Method Reference: EPA,"Methods For The Determination Of Organic Compounds In Finished Drinking Water And Raw Source Water", September, 1986. Method 502.2.

WARZYN

Warzyn Engineering Inc.
[redacted]ience[redacted]
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
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# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME Refuse Hideaway Lf. - Pilot System

LOCATION: Schultz Residence, Middleton

SAMPLERS: (Signature) S.C. Ait-Slk

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs (SDWA) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 38618 ~~STD~~ 10/24/89 | 10.24.89 | 23:45 | STD | X | Schultz - 1 | 2 | X | Raw - 1 week TAT |
| 38619 A | | 23:40 | | | - 1.1 | 2 | | after first filter - ↓ STD 10/25 |
| 336 | | 23:35 | | | 1.2 | 2 | | after second filter - 2 ~~1 week TAT~~ Hold pending above results |
| 337 | | 23:30 | ↓ | ↓ | ↓ 1.3 | 2 | ↓ | 1 vial w/ air after third filter ↓ |
| 38620A | ↓ | 23:50 | | | Schultz 1 Dup | 2 | | Raw - 1 week TAT |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| SC Ait-Slk | 10/25/89 8:15 | | | | |
| | | | | | |
| | | | | | |

| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time |
|---|---|---|---|
| | | Kari-Ann Fink | 10/25/89 9:00 am |

Remarks Flow Rate - 0.47 gpm

elec. meter Reading - @ 11:28 PM - 563 gallons — ON 10/24/89

manual meter Reading @ 11:28 PM - 2899970 gallons

~~2x price~~ 1.75x price

START → Elec. meter Reading @ 3:35 PM - 0 gallons (7072)

Manual meter Reading @ 3:35 PM - 2899,460 gallons

Electronic meter - Series 485 MultiFlow Monitor/controller, Manual Meter - BADGER RECORDALL MODEL 15

PROJECT MANAGER: Steve Teemont

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

№ 8 3198

Warzyn Engineering Inc.
[redacted] Science [redacted]
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P.O. Box 5385
Madison, Wisconsin 53705
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# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME: Refuse Hideaway - Pilot Study

LOCATION: Middleton

SAMPLERS: (Signature) Steve Wolter

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs (1+1 HCL) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 38621A | 10-25-89 | 7:36 | | X | Schultz - 2 | 2 | X | Raw - 1 week TAT |
| 38622A | | 7:34 | | | - 2.1 | 2 | X | after 1st filter - ↓ |
| 338 | | 7:32 | | | - 2.2 | 2 | X | after 2nd filter - *analyze if necessary |
| 339 | ↓ | 7:30 | | ↓ | - 2.3 | 2 | X | after 3rd filter - ↓ |

GW 10-25-89

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Steve Wolter | 10-25-89 800 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari-Ann Finke | | 10/25/89 9:00 am | |

Remarks at 7:30 pm - 10.25.89
mechanical meter - 2900360
electric meter - 987
flow rate - 0.197 gpm
* Analyze with 2 week TAT if necessary - consult Steve Teerman with results from 1 week TAT samples

2x price

PROJECT MANAGER: Steve Teerman

7072

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

WF60913

№ 8.3199

WARZYN

[redacted] Warz[redacted]ineeri[redacted]
One Science Court
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME Refuse Hideaway - Schultz Dump

LOCATION: Middleton

SAMPLERS: (Signature) Steve Wurbs

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs preserved with HCl | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 38675 | 10-25-89 | 1538 | | X | Schultz - 3 | 2 | X | Raw 1 week TAT |
| 38676 | | 1536 | | | 3.1 | 2 | | after first filter 1 week TAT |
| 341 | | 1534 | | | 3.2 | 2 | | after second filter hold until S. Tennants okay |
| 342 | | 1532 | | | 3.3 | 2 | | after third filter |
| 343 | | 1530 | | ↓ | 3.3 dup | 2 | ↓ | |

GW

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Steve Wurbs | 10-25-89 16:10 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari-Ann Finke | | 10/26/89 8:00 am | |

Remarks

mechanical meter - 2900820
electric meter - 1470
flow rate - .97 to 1.15

PROJECT MANAGER: Steve Tennant

1 week TAT - 2X price
1.75X
Key 10/27/89

7085

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

No. 8 3200

WARZYN

[redacted] Warz[redacted]ineeri[redacted]
One Science Court
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME: REFUSE HIDEAWAY L.F. - PILOT STUDY

LOCATION: SCHULTZ RESIDENCE, MIDDLETON

SAMPLERS: (Signature) Scott Schultz

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs (SDWA) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | GW |
| 38680 | 10/25/89 | 23:40 | | X | SCHULTZ - 4 | 2 | X | RAW - 1 WEEK TAT |
| 38681 | ↓ | 23:35 | | ↓ | - 4-1 | 2 | ↓ | AFTER 1st FILTER - 1 WEEK TAT |
| 344 | | 23:30 | | | - 4.2 | 2 | | AFTER 2nd FILTER - HOLD PENDING. |
| 345 | ↓ 315 | 23:25 | | | - 4.3 | 2 | | AFTER 3rd FILTER - ABOVE RESULTS |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Scott Schultz | 10/26/89 8:20 | | | | |
| | | | | | |
| | | | | | |

| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time |
|---|---|---|---|
| | | Kari Ann Funk | 10/26/89 8:40 am |

Remarks: ELECTRIC METER READING - 1960 GALLONS
MANUAL METER READING - 290/280 GALLONS
@ 23:30 PM 10/25/89
FLOW RATE - .97/1.15 gpm

PROJECT MANAGER: S. TERMONT

1 week TAT 2x price 1.75 KFF 10/27/89

7087

Warzyn Engineering Inc.
One Science Court
Uni[redacted] Research
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME: Refuse Hideaway - Schultz Samplng

LOCATION: Schultz Residence

SAMPLERS: (Signature) Steve Wiskes

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs (preserved w/HCl) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 38683 | 10.26.89 | 0830 | | X | Schultz - 5 | 2 | X | Raw - 1 week TAT |
| 38684 | ↓ | 0834 | | ↓ | 5.1 | ↓ | ↓ | after first filter - ↓ |
| 346 | | 0832 | | | 5.2 | | | after second filter - hold until S. Tennant advises you |
| 347 | ↓ | 0830 | | ↓ | 5.3 | ↓ | ↓ | after third filter - ↓ |

GW

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Steve Wiskes | 10.26.89 0900 | | | | |
| | | | | | |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari-Ann Link | | 10/26/89 9:35 a.m. | |

Remarks 10.26.89 - 0830
mechanical meter - 2901840
electric meter - 2578
flow rate - 1.15

1 week TAT 1.75 & x price Kaj 10/27/89

PROJECT MANAGER: Steve Tennant

7089

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

№ 8_3201

WARZYN

Warzyn Engineering Inc.
[redacted]ience[redacted]
University Research Park
P.O. Box 5385
Madison, Wisconsin 53705
(608) 273-0440

# CHAIN OF CUSTODY RECORD

PROJ. NO. 13928.10

PROJECT NAME Retreat Hideaway

LOCATION: Schultz Residence

SAMPLERS: (Signature) Steve Wilkes

| LAB NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs 1+1HCl | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 38764 | 10/26/89 | 1741 | | X | Schultz - 6 | 2 | X | Raw — 1 week TAT |
| 38765 | | 1739 | | | 6.1 | | | first filter ↓ |
| 38766 | | 1739 | | | 6.1 dup | | | ~~Second~~ SCW 10/26/89 first filter |
| 349 | | 17:37 | | | 6.2 | | | second filter — Hold |
| 350 | ↓ | 1735 | | ↓ | 6.3 | ↓ | ↓ | third filter ↓ |

GW

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| Steve Wilkes | 10/26/89 1815 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | | Date / Time | |
| | | Kari-Ann Fink | | 10/27/89 7:45 am | |

Remarks

mechanical meter — 2902420
electric meter — 3218
flow rate — 0.97

PROJECT MANAGER: ~~Steve Ta~~ SCW 10/26/89 Teeman

1 week TAT 1.75x price

7100

Distribution: White — Accompanies Shipment; Yellow — Laboratory File; Pink — Coordinator Field Files

№ 8 3202

# Appendix C

## DILHR Plumbing Product Review
## Application Materials

HELLENBRAND

**WATER CONDITIONERS, INC.**

APPLICATION FOR PLUMBING PRODUCT REVIEW
REQUIRED INFORMATION FOR WATER TREATMENT DEVICES

DILHR FILE NO: 890217

CONFIDENTIAL BUSINESS INFORMATION DESIGN

TRADE NAME: HELLENBRAND
MODEL NUMBER: POE-VOC-14

MANUFACTURER: HELLENBRAND WATER CONDITIONERS, INC.
P.O. BOX 187 - 509 WEST MAIN STREET
WAUNAKEE, WI 53597
(608)849-5717

PRODUCT ENGINEER: JEFFREY J. HELLENBRAND

1. Two Copies Of Sales, Installation, Owners And/Or Operation Manuals.
   A. See enclosed item(s) marked 1A.

2. Detailed Description Of The Function
   A. See enclosed item(s) marked 2A.

3. Detailed Assembly Drawings
   A. See enclosed drawing(s) marked 3A.

4. Sizes, Colors, Locations, Information Shown And Methods For Labeling The Product. Must Conform To: ILHR 84.20(5)(0) On Page 387
   A. Hellenbrand Logo - enclosed
   B. Maximum Service Flow Rate Per Tank - enclosed
   C. Model Number And/Or System Description - enclosed

5. Installation Instructions
   A. See items from 1A

6A. List Of National Standards Referenced In ILHR 82, 83 or 84, Wis. Adm. Code, To Which This Conforms.
   A. None

6B. Standards Not Listed in 6A, In Which It Conforms
   A. None

7. Specifications For Materials Of Construction Which Come Into Contact With Potable Water (See Line Drawing From 3A Above)
   A. Structural Fibers FRP Mineral Tank
      14" x 65" FRP Tank, NSF Listed, See Bulletin #WT-02
   B. Clack Corporation Distributor Assembly
      13/16" x 65" Distributor Tube Assembly - Cosden Hips by Fina Oil & Chemical, NSF Listed

C. Clack 890C Distributor Head
ABS CSM 4500 F (Black) Acrylonitrile Butadiene Styrene Copolymer, FDA Compliance. See Bulletin #1653

D. Calgon Filtrasorb 400 GAC
Iodine Number, min. - 1000
Abrasion Number, min. - 75
Moisture (Max.) - 2.0%
See Bulletin #20-68b

8. Trade Name, Scientific Name ...etc. Of Any Chemicals Used.
A. None

9. Signed Report Providing Testing Information Which Concludes The Product Functions And Performs ...etc.
A. See Warzyn Report From Pilot System On Shultz Residence
B. Pilot System Consisted Of The Following Equipment:
1 - (3) 7" x 44" Structural Fibers PolyGlass Mineral Tanks, with .50 Cubic Feet Of Calgon Filtrasorb 400 GAC Per Tank, Clack 13/16" Distributor Assembly, Clack 890C Distributor Head Assembly
2 - 1.0 GPM Flow Control On The Inlet Of The First Filter
3 - Autotrol 485 Microprocessor Meter Control To Record Gallons Per Minute And Total Gallons
4 - Badger Meter 5/8" Totalizing Meter
5 - Ametek #10 Clear Filter Housing To Remove Sediment Ahead Of The Meters And Filters
6 - Test Cocks For Influent/Effluent For Each Filter
C. Pilot System was exhausted at 1.0 GPM, which was equivalent to exhausting the POE-VOC-GAC-14 System at its maximum flow rate of 10 GPM. Pilot System ran for fifty (50) hours at its maximum flow rate of 1.0 GPM or 3,000 total gallons. Actual total gallons on Warzyn report may differ slightly from the 3,000 gallons. The fifty (50) hour test run at the maximum flow rate was used, since it is estimated that each household would require approximately 5,000 gallons per month, or 30,000 gallons every six months. Expiring the wholehouse system at its maximum flow rate of 10 GPM, would be equivalent to fifty (50) hours.

10. Disposal Requirements For Wastewater, Backwash ..etc.
A. None
B. Disposal Of GAC Will Be Done According To Guidelines Outlined By Warzyn Engineering And DNR

11. Graph Indicating Pressure Loss, In PSIG, Through POE Product, Over The Entire Flow Rate Range, In U.S. Gallons Per Minute
A. See Graph Enclosed. Actual Tesing Done By Clack Corporation In Their Lab.

12. Operating And Maintenance Manuals ...
A. Included in Item(s) 1A

Document Name - Refuse

Manufactured by:
**HELLENBRAND WATER CONDITIONERS, INC.**
509 W. Main Street · Waunakee, WI 53597
608-251-7681 or 608-849-5717

JOB: WARZYN/DNR/REFUGE HIDEAWAY

& WHOLE HOUSE VOC

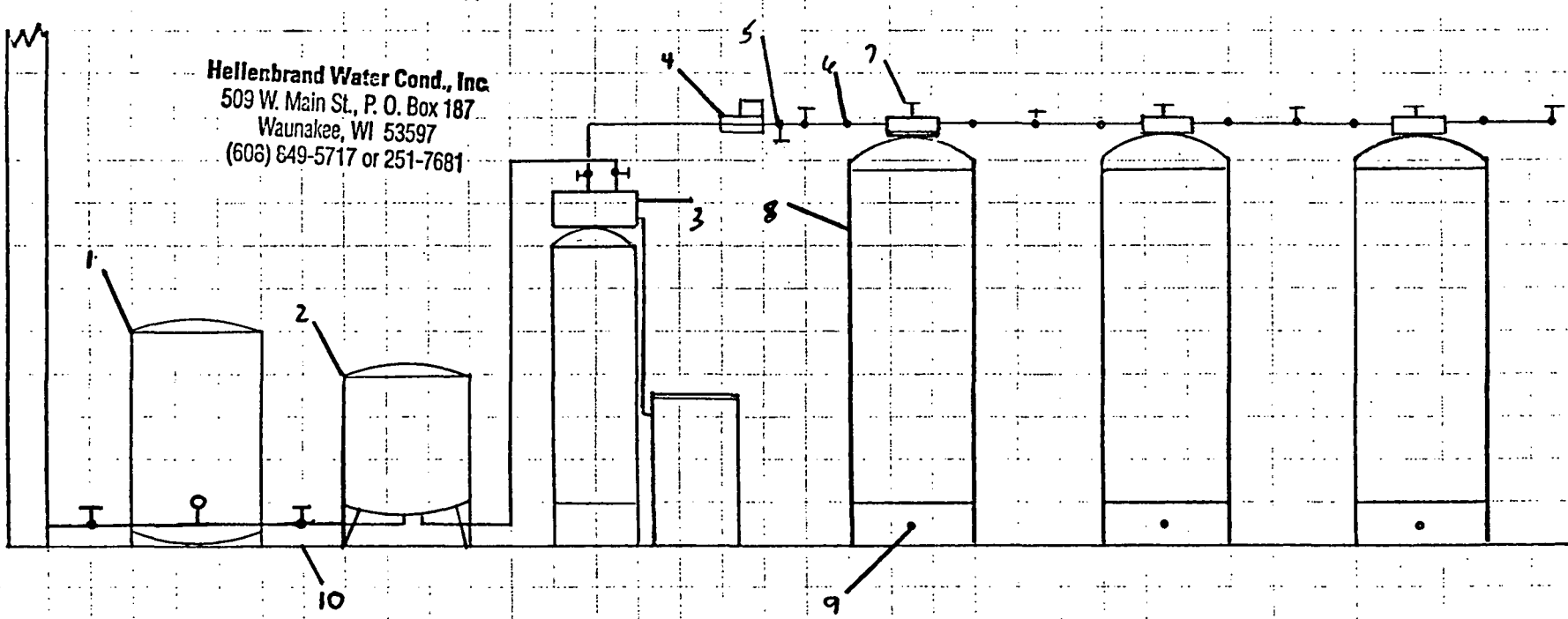
DILHR FILE #: 890217

Item # 1A

INSTALLATION LAYOUT

CONFIDENTIAL BUSINESS INFORMATION DESIGN

**Hellenbrand Water Cond., Inc.**
509 W. Main St., P. O. Box 187
Waunakee, WI 53597
(608) 849-5717 or 251-7681




| | | | |
|---|---|---|---|
| 1 | PRESSURE TANK | 7 | EFFLUENT SAMPLE COCK |
| 2 | HARMSCO FILTER | 8 | GAC FILTERS) |
| 3 | SOFTENER | 9 | BOTTOM DRAIN |
| 4 | WATER METER | 10 | IRON FILTER (NOT SHOWN, INSTALLED AFTER PRESSURE TANK IF NEEDED) |
| 5 | INFLUENT SAMPLE COCK | | |
| 6 | UNION | | |

JJH-1089

[redacted] WARZYN [redacted]

Manufactured by:
**HELLENBRAND WATER CONDITIONERS, INC.**
509 W. Main Street · Waunakee, WI 53597
608-251-7681 or 608-849-5717

JOB: WARZYN/DNR/REFUGE HIDEAWAY

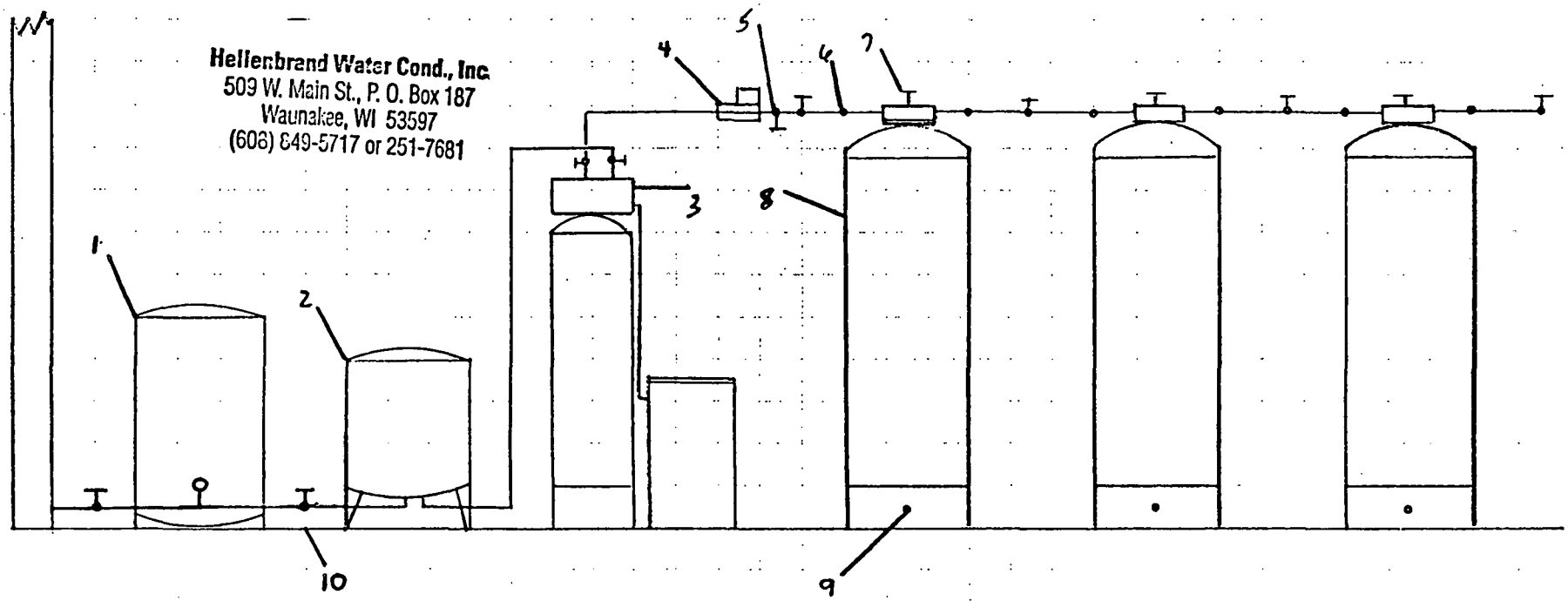
WHOLE HOUSE VOC

DILHR FILE #: 890217

Item # 1A

INSTALLATION LAYOUT

CONFIDENTIAL BUSINESS INFORMATION DESIGN




| | | | |
|---|---|---|---|
| 1 | PRESSURE TANK | 7 | EFFLUENT SAMPLE COCK |
| 2 | HARMSCO FILTER | 8 | GAC FILTERS) |
| 3 | SOFTENER | 9 | BOTTOM DRAIN |
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| 5 | INFLUENT SAMPLE COCK | | |
| 6 | UNION | | |

JJH-1089

[redacted]

HELLENBRAND

WATER CONDITIONERS, INC.

SPECIAL GAC
CHEMICAL CONTAMINATE SYSTEM FOR POINT-OF-ENTRY

NOTE: THIS SYSTEM CANNNOT BE INSTALLED ON NON-POTABLE WATER SUPPLIES, WITHOUT PRIOR WRITTEN APPROVAL FROM LOCAL, STATE AND/OR FEDERAL AGENCIES. EX. WISCONSIN DILHR, WISCONSIN DNR, EPA ...ETC.

## PRE-INSTALLATION CHECK LIST

Water Pressure: A minimum of 25 psi is recommended to maintain an adequate pressure after the filter system.

Electrical: None

Existing Plumbing: Must be free from lime and/or iron buildup. Piping that is built up heavily should be replaced. Pretreatment for hardness and/or iron removal may be necessary.

Drain: System should be located near a floor drain, to facilitate changeouts of filter(s), which will be drained before removing.

Caution: Water pressure is not to exceed 100 p.s.i., temperature is not to exceed 100 F., and the system cannot be subject to freezing conditions.

## INSTALLATION INSTRUCTIONS

1. Review the enclosed installation layout line drawing.
2. Place the system where you want to install, making sure it is level and on a firm base.
3. Do all necesssary plumbing (inlet to inlet, outlet to outlet). All plumbing should be done in accordance with local and state plumbing codes.

NOTE: IN SOME INSTANCES, THE PLUMBING CODE MAY PROHIBIT BYPASSES.

## START-UP

1. Connect a garden hose to the outlet test cock on the first filter.
2. Close the valve between the first and second filter.
3. Open the inlet valve and begin to fill the first filter, allowing the excess air and discoloration to escape.
4. When the air and discoloration is removed from the first filter, close the outlet test cock, connect the garden hose to the outlet test cock on the second unit, close the outlet valve between units two and three and open the valve between units one and two.
5. Repeat the above steps until all of the filters have been relieved air and discoloration.

Water Quality Association®
MEMBER

509 W. Main Street, P.O. Box 187
Waunakee, WI 53597

PHONES: (608) 849-5717, (608) 251-7681
FAX: (608) 849-7398

HELLENBRAND

WATER CONDITIONERS, INC.

SPECIAL GAC
CHEMICAL CONTAMINATE SYSTEM FOR POINT-OF-ENTRY

NOTE: THIS SYSTEM CANNNOT BE INSTALLED ON NON-POTABLE WATER SUPPLIES, WITHOUT PRIOR WRITTEN APPROVAL FROM LOCAL, STATE AND/OR FEDERAL AGENCIES. EX. WISCONSIN DILHR, WISCONSIN DNR, EPA ...ETC.

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Waunakee, WI 53597

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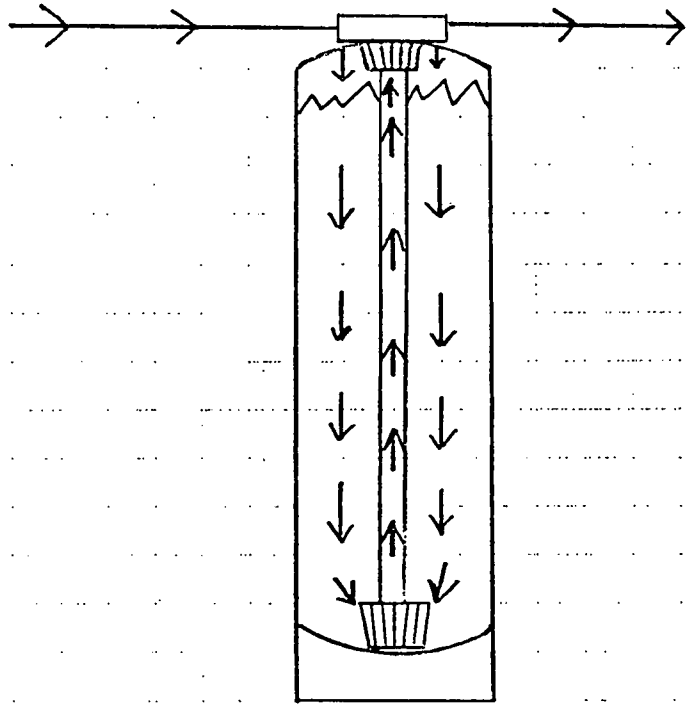
FAX: (608) 849-7398

Item # 1A

# FLOW DIAGRAM SERVICE

**Hellenbrand Water Cond., Inc**
509 W. Main St., P. O. Box 187
Waunakee, WI 53597
(608) 849-5717 or 251-7681

CONFIDENTIAL BUSINESS
INFORMATION DESIGN

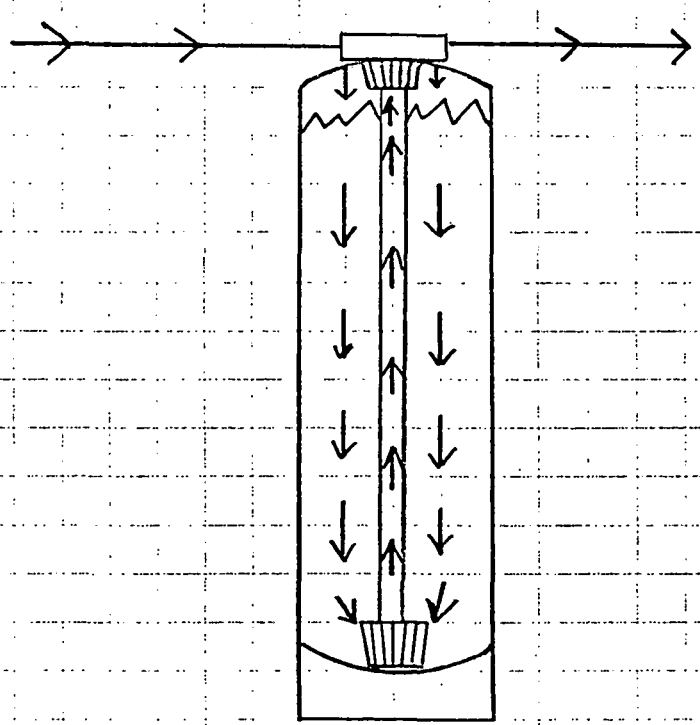


Item # 1A

# FLOW DIAGRAM SERVICE

**Hellenbrand Water Cond., Inc.**
509 W. Main St., P. O. Box 187
Waunakee, WI 53597
(608) 849-5717 or 251-7681

CONFIDENTIAL BUSINESS
INFORMATION DESIGN



HELLENBRAND

WATER CONDITIONERS, INC.

ITEM 2A.

DETAILED DESCRIPTION OF THE FUNCTION

The POE-VOC-GAC whole house system is designed for the removal/reduction of certain volatile organic contaminates. A minimum contact time of ten (10) minutes at the peak flow rate of the system is needed. Model # POE-VOC-GAC-14 uses a 14" x 65" vessel, contains 5.0 cubic feet of Calgon Filtrasorb 400 GAC. The total gallons the 14" x 65" vessel can hold is 39.7 or 5.3 cubic feet. The maximum flow rate through each vessel, with ten (10) minutes of contact time is 3.5 gpm. For higher flow rates, filters can be installed in series to achieve the desired flow. For example, a 10 gpm flow rate would require three (3) filters. The voc's are absorbed by the Calgon Filtrasorb 400 GAC.

Sampling tests cocks are installed on the influent and effluent of each filter. Sampling frequency should be done on each filter as determined by the agency in charge of the project, DNR, DILHR, EPA ...etc. If no frequency for water analysis is given, we recommend that it be done monthly. (~5,000 gal)

The frequency of filter changeouts is determined by the water analysis results, gallons run through the system and/or time. The filters must be changed out a minimum of once a year. In some cases where several filters are installed in series, only the first filter may be changed and then the remaining filters will each be moved up to take the place of the filter ahead of it and the new filter will be installed to take the place of the last filter in series.

IMPORTANT: The only way to make sure the system is working properly, is to have your water tested by a certified lab, before and after each filter. In Wisconsin you may contact the DNR for a list of certified labs. Water analysis, filter changeouts, ...etc are not included in the selling price of our equipment.

can this be easily done with this size filter?

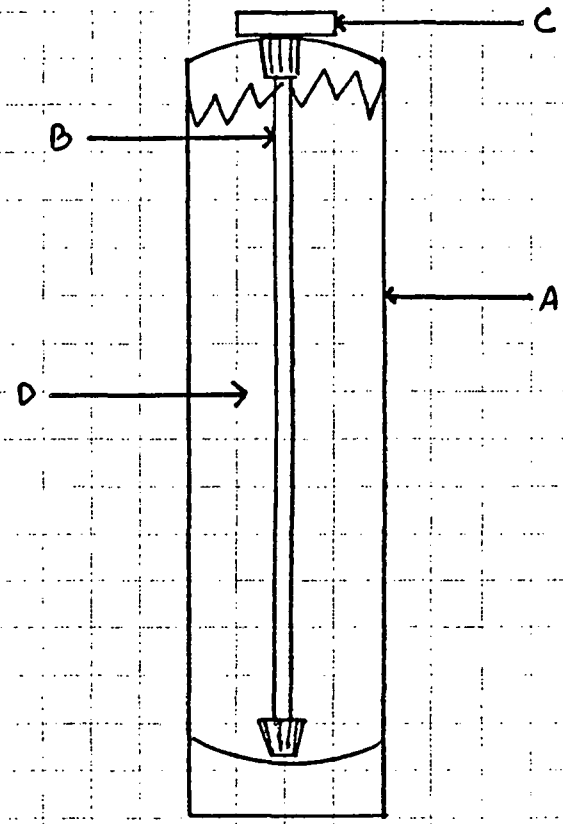
Water Quality Association MEMBER

509 W. Main Street, P.O. Box 187
Waunakee, WI 53597

PHONES: (608) 849-5717, (608) 251-7681
FAX: (608) 849-7398

MODEL # POE-VOC-GAC-14

ITEM - 3A




HELLENBRAND WATER COND., INC.
509 West Main Street
P.O. Box 187
Waunakee, WI 53597

CONFIDENTIAL BUSINESS INFORMATION DESIGN

A - STRUCTURAL FIBERS MINORAL TANK - 14" x 65"

B - CLACK DISTRIBUTOR ASSY 13/16"

C - CLACK 890C MANIFOLD ASSY

D - CALGON FILTRASORB 400 5.0 CU.FT.

JJH/1189

HELLENBRAND

WATER CONDITIONERS, INC.


HELLENBRAND
POE - VOC
3.33 GPM

Water Quality Association®
MEMBER

509 W. Main Street, P.O. Box 187
Waunakee, WI 53597

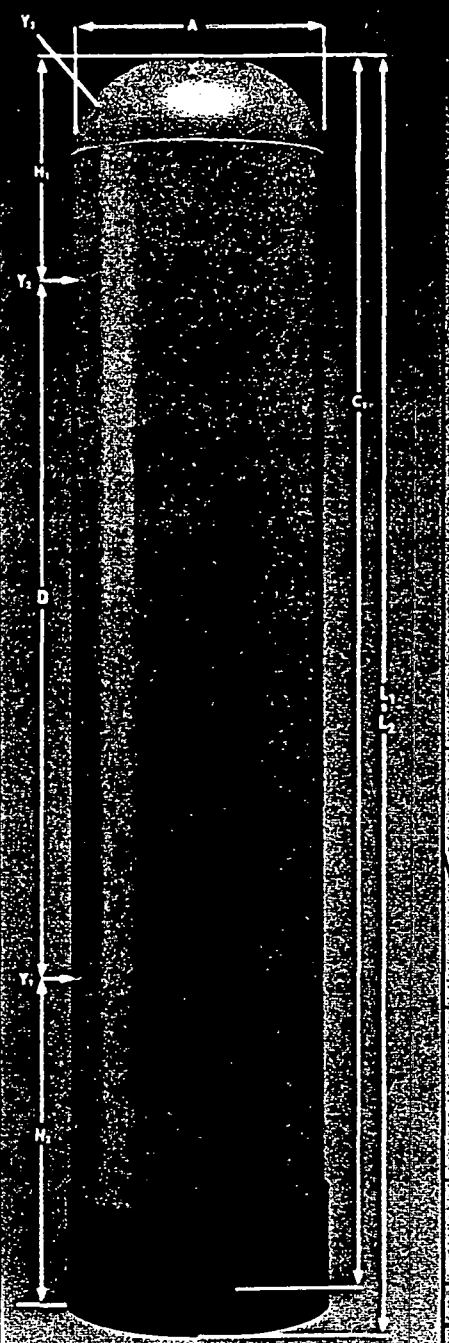
PHONES: (608) 849-5717, (608) 251-7681
FAX: (608) 849-7398

# FRP Residential/ Light Commercial

## Water Treatment Pressure Vessels

U.S. STANDARD

| Tank Size | Gals. | Cu. Ft. | NOMINAL SIZE A | NOMINAL SIZE $C_1$ | DIMENSIONS IN INCHES Std. Base $L_1$ | DIMENSIONS IN INCHES Ext. Base $L_2$ | D | $H_1$ | $H_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 6 x 13 | 1.6 | .2 | 6.0 | 13.0 | 12.8 | 18.7 | 6.0 | 3.1 | 3.5 |
| 6 x 18 | 2.3 | .3 | 6.0 | 18.0 | 18.1 | 24.0 | 9.4 | 4.1 | 4.5 |
| 6 x 35 | 4.4 | .6 | 6.0 | 35.0 | 35.1 | 41.0 | 26.4 | 4.1 | 4.5 |
| 7 x 24 | 3.8 | .5 | 7.0 | 24.0 | 24.1 | 30.0 | 15.1 | 4.9 | 4.1 |
| 7 x 30 | 4.8 | .6 | 7.0 | 30.0 | 30.2 | 36.0 | 21.1 | 4.9 | 4.1 |
| 7 x 35 | 5.7 | .8 | 7.0 | 35.0 | 35.1 | 40.9 | 26.0 | 4.9 | 4.1 |
| 7 x 40 | 6.6 | .9 | 7.0 | 40.0 | 40.2 | 46.0 | 31.1 | 4.9 | 4.1 |
| 7 x 44 | 7.3 | 1.0 | 7.0 | 44.0 | 44.4 | 50.2 | 35.3 | 4.9 | 4.1 |
| 8 x 17 | 3.1 | .4 | 8.0 | 17.0 | 17.2 | 23.0 | 7.2 | 5.3 | 4.4 |
| 8 x 24 | 4.6 | .6 | 8.0 | 24.0 | 24.3 | 30.1 | 14.3 | 5.3 | 4.4 |
| 8 x 30 | 6.0 | .8 | 8.0 | 30.0 | 30.2 | 36.0 | 20.2 | 5.3 | 4.4 |
| 8 x 35 | 7.1 | .9 | 8.0 | 35.0 | 35.2 | 41.0 | 25.2 | 5.3 | 4.4 |
| 8 x 40 | 8.2 | 1.1 | 8.0 | 40.0 | 40.3 | 46.1 | 30.3 | 5.3 | 4.4 |
| 8 x 44 | 9.1 | 1.2 | 8.0 | 44.0 | 44.5 | 50.2 | 34.4 | 5.3 | 4.4 |
| 9 x 35 | 8.8 | 1.2 | 9.0 | 35.0 | 35.3 | 41.0 | 24.5 | 5.3 | 5.2 |
| 9 x 40 | 10.3 | 1.4 | 9.0 | 40.0 | 40.3 | 46.0 | 29.5 | 5.3 | 5.2 |
| 9 x 48 | 12.5 | 1.7 | 9.0 | 48.0 | 48.3 | 54.0 | 37.5 | 5.3 | 5.2 |
| 10 x 19 | 5.1 | .7 | 10.0 | 19.0 | 19.3 | 24.8 | 8.0 | 5.8 | 5.2 |
| 10 x 30 | 8.8 | 1.2 | 10.0 | 30.0 | 30.4 | 36.0 | 19.3 | 5.8 | 5.2 |
| 10 x 35 | 10.4 | 1.4 | 10.0 | 35.0 | 35.2 | 40.7 | 23.8 | 5.9 | 5.2 |
| 10 x 40 | 12.1 | 1.6 | 10.0 | 40.0 | 40.3 | 45.8 | 28.9 | 5.9 | 5.2 |
| 10 x 42 | 12.7 | 1.7 | 10.0 | 42.0 | 42.3 | 47.8 | 31.0 | 5.8 | 5.2 |
| 10 x 44 | 13.4 | 1.8 | 10.0 | 44.0 | 44.3 | 49.9 | 33.1 | 5.8 | 5.2 |
| 10 x 47 | 14.4 | 1.9 | 10.0 | 47.0 | 47.3 | 52.8 | 36.0 | 5.8 | 5.2 |
| 10 x 54 | 16.7 | 2.2 | 10.0 | 54.0 | 54.3 | 59.8 | 43.0 | 5.8 | 5.2 |
| 12 x 48 | 23.4 | 3.1 | 12.0 | 48.0 | 48.9 | 53.8 | 35.0 | 6.6 | 6.4 |
| 13 x 54 | 27.6 | 3.7 | 13.0 | 54.0 | 54.9 | 59.8 | 35.6 | 9.1 | 9.3 |
| 14 x 65 | 39.7 | 5.3 | 14.0 | 65.0 | 65.7 | 70.5 | 43.0 | 10.8 | 11.1 |
| 16 x 65 | 48.3 | 6.4 | 16.0 | 65.0 | 65.9 | 71.1 | 41.7 | 11.5 | 11.9 |




METRIC

| Tank Size | Liters | NOMINAL SIZE A | NOMINAL SIZE $C_1$ | DIMENSIONS IN MILLIMETERS Std. Base $L_1$ | DIMENSIONS IN MILLIMETERS Ext. Base $L_2$ | D | $C_1$ | $H_2$ |
|---|---|---|---|---|---|---|---|---|
| 6 x 13 | 6.1 | 152 | 330 | 325 | 475 | 152 | 79 | 89 |
| 6 x 18 | 8.7 | 152 | 457 | 460 | 610 | 239 | 104 | 114 |
| 6 x 35 | 16.6 | 152 | 889 | 892 | 1041 | 671 | 104 | 114 |
| 7 x 24 | 14.4 | 178 | 610 | 612 | 762 | 384 | 124 | 104 |
| 7 x 30 | 18.2 | 178 | 762 | 767 | 914 | 536 | 124 | 104 |
| 7 x 35 | 21.6 | 178 | 889 | 892 | 1039 | 660 | 124 | 104 |
| 7 x 40 | 25.0 | 178 | 1016 | 1021 | 1168 | 790 | 124 | 104 |
| 7 x 44 | 27.6 | 178 | 1118 | 1128 | 1275 | 897 | 124 | 104 |
| 8 x 17 | 11.7 | 203 | 432 | 437 | 584 | 183 | 135 | 112 |
| 8 x 24 | 17.4 | 203 | 610 | 617 | 764 | 363 | 135 | 112 |
| 8 x 30 | 22.7 | 203 | 762 | 767 | 914 | 513 | 135 | 112 |
| 8 x 35 | 26.9 | 203 | 889 | 894 | 1041 | 640 | 135 | 112 |
| 8 x 40 | 31.0 | 203 | 1016 | 1024 | 1171 | 770 | 135 | 112 |
| 8 x 44 | 34.4 | 203 | 1118 | 1130 | 1275 | 874 | 135 | 112 |
| 9 x 35 | 33.3 | 229 | 889 | 897 | 1041 | 622 | 135 | 132 |
| 9 x 40 | 39.0 | 229 | 1016 | 1024 | 1168 | 749 | 135 | 132 |
| 9 x 48 | 47.3 | 229 | 1219 | 1227 | 1372 | 952 | 135 | 132 |
| 10 x 19 | 19.3 | 254 | 483 | 490 | 630 | 203 | 147 | 132 |
| 10 x 30 | 33.3 | 254 | 762 | 772 | 914 | 490 | 147 | 132 |
| 10 x 35 | 30.4 | 254 | 889 | 894 | 1034 | 605 | 150 | 132 |
| 10 x 40 | 45.9 | 254 | 1016 | 1024 | 1163 | 734 | 150 | 132 |
| 10 x 42 | 48.1 | 254 | 1067 | 1074 | 1214 | 787 | 147 | 132 |
| 10 x 44 | 50.7 | 254 | 1118 | 1125 | 1267 | 841 | 147 | 132 |
| 10 x 47 | 54.5 | 254 | 1194 | 1201 | 1341 | 914 | 147 | 132 |
| 10 x 54 | 63.2 | 254 | 1372 | 1379 | 1519 | 1092 | 147 | 132 |
| 12 x 48 | 88.6 | 305 | 1219 | 1242 | 1366 | 889 | 168 | 162 |
| 13 x 54 | 104.5 | 330 | 1372 | 1394 | 1519 | 904 | 231 | 236 |
| 14 x 65 | 150.3 | 356 | 1651 | 1669 | 1791 | 1092 | 274 | 282 |
| 16 x 65 | 182.8 | 406 | 1651 | 1674 | 1806 | 1052 | 292 | 302 |

## FRP TANKS

FRP tanks are constructed of a fiberglass reinforced polyester resin for standard water conditioning use and of fiberglass reinforced vinylester resin for DI applications. Unlike other tanks and metal vessels, FRP tanks feature a one-piece construction. That means there are no seams, welds or joints which can corrode, electrolyze, give away or leak. Finished tanks are about one-third the weight of comparable steel tanks, so they are easier and more economical to handle.

Structural Fibers

A Division of Structural Fibers, Inc.

| NOMINAL DIAMETER | | STANDARD VESSEL OPENINGS | | | |
|---|---|---|---|---|---|
| | | TOP | BOTTOM | SIDEWALL | DOME |
| MM | INCH | X | Z | $Y_1$ and $Y_2$ | $Y_3$ |
| 160 | 6 | 2½"—8 NPSM | 1" or 2½" | ¾" | ¾" |
| 180 | 7 | 2½"—8 NPSM | 1" or 2½" | ¾" | ¾" |
| 210 | 8 | 2½"—8 NPSM | 1" or 2½" | ¾" or 1" | ¾" |
| 230 | 9 | 2½"—8 NPSM | 1" or 2½" | ¾" or 1" | 1¼" |
| 260 | 10 | 2½"—8 NPSM or 4"—8 UN | 1", 2½" or 4" | ¾" or 1" | 1¼" |
| 300 | 12 | 2½"—8 NPSM or 4"—8 UN | 2½" or 4" | ¾" or 1" | 1¼" |
| 330 | 13 | 2½"—8 NPSM or 4"—8 UN | 2½" or 4" | ¾" or 1" | 1¼" |
| 360 | 14 | 4"—8 UN | 4" or 6" | ¾" or 1½" | 1¼" |
| 400 | 16 | 4"—8 UN or 6"—8 UN | 4" or 6" | ¾" or 1½" | 1¼" |

# Notes

1. For 6" through 16" diameter polyester tanks with a bottom opening "Z," an extended base can be supplied. Access hole "W" is to be supplied by the customer unless otherwise specified.
2. All side hole dimensions ($H_1$, D and $H_2$) are based on the maximum hole of $Y_1$ and $Y_2$.
3. Dome hole $Y_3$ is possible in 6" through 16" FRP tanks. Dome holes are located mid-dome and are not oriented to top opening threads stopping point. Orientation may be possible depending upon your requirements.
4. Thread types on above chart are: ¾"—2" are NPT, 2½"—8 are NPSM, and 4"—8 and 6"—8 are UN.
5. Any custom opening not listed here can be considered. Please call Structural Fibers Customer Service with your needs.

- Polyester FRP tanks are available in either blue or translucent natural. Vinylester tanks are manufactured in translucent natural only.
- Larger FRP pressure vessels available up to 36" diameter. See Structural Fibers' Commercial/Industrial brochure.

# Tests and Approvals

All vessels are tested at recommended working pressure before being shipped. Our tanks and vessels, or the materials used in their construction, have been accepted or approved by these major government agencies and industry groups.

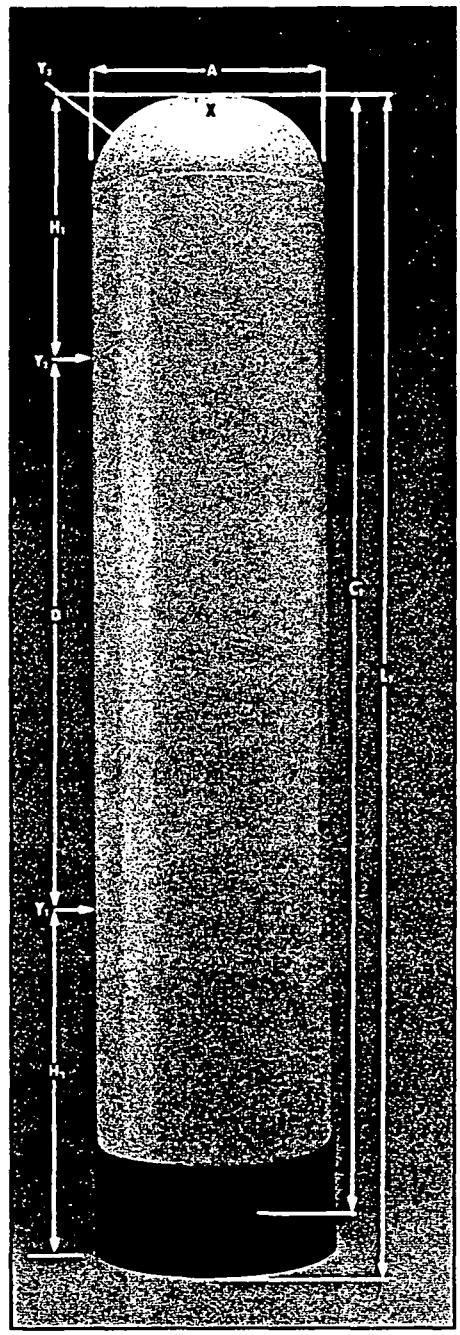
NSF Water Quality Member

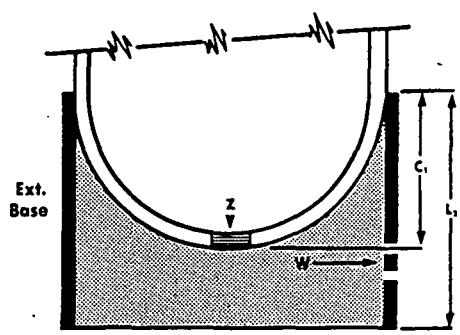
# Physical Properties

- Physical constant—Operating pressure **150 psi**
  —Polyester to 120°F
  —Vinylester to 150°F
- Tensile strength 30 x $10^3$ psi
- Density .067 LB/in$^3$
- Compressive strength 25 x $10^3$ psi

# Warranty

A limited warranty applies to each FRP pressure vessel manufactured by Structural Fibers. Polyester vessels used according to design in residential/light commercial applications are warranted for 5 years. Vinylester vessels used for DI applications are warranted for 2 years. Warranty specifically does not cover sandblasting of tank caused by faulty distribution systems or fractures caused by external impact to the tank.





**Structural Fibers**

An **ESSEF** Company

National Sales Office:
920 Davis Road,
Suite 108,
Elgin, Illinois 60123.
Phone: 312/888-2000.
Fax: 312/888-0368.

Customer Service:
Industrial Parkway,
Chardon, Ohio 44024.
Phone: 216/286-4116.
Fax: 216/286-6759.
Telex: 980481.

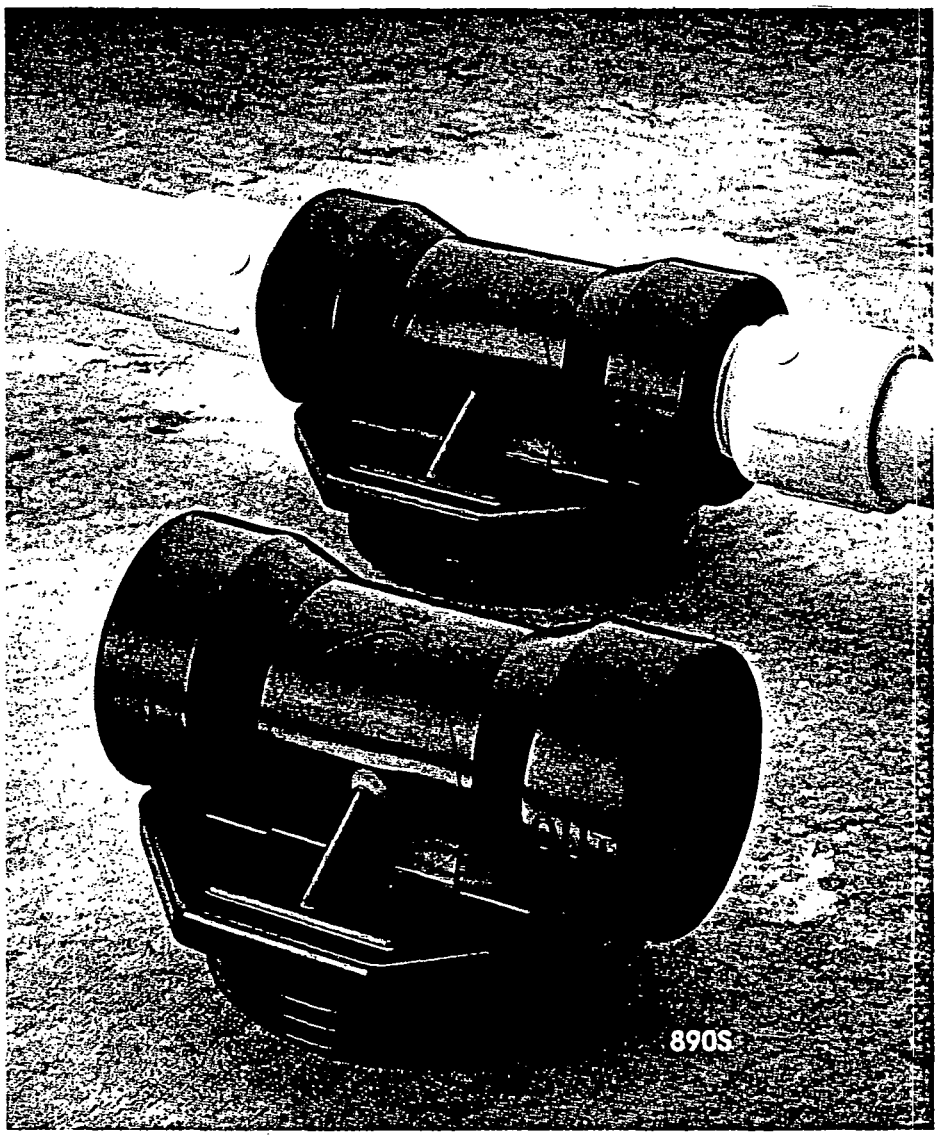
SF West:
1700 Chablis Avenue,
Ontario, California 91761.
Phone: 714/983-4171.
Fax: 714/984-2690.

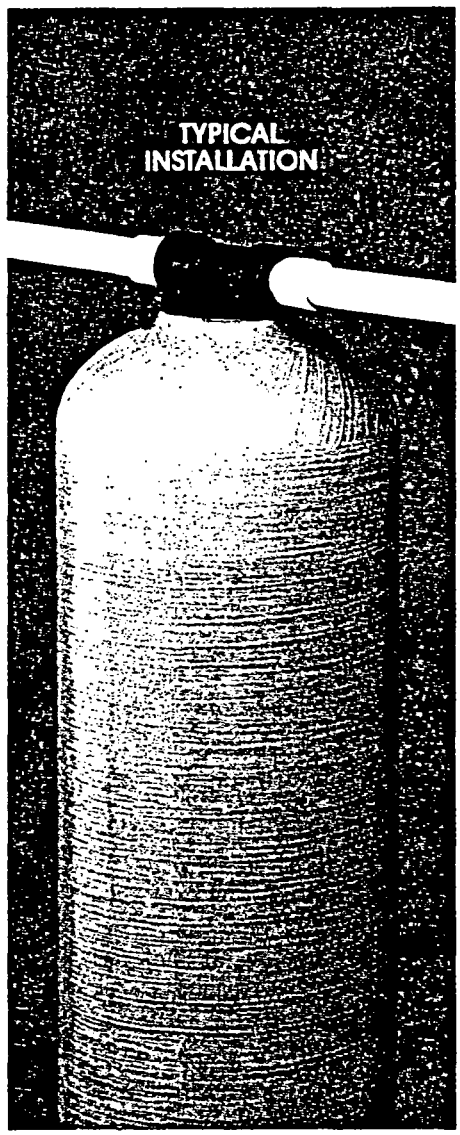


BD&A3/8825M
Form WT-02

Rugged economical plastic distributor heads for single in-out applications on simple filters.

# 890 Series Plastic Distributor Heads



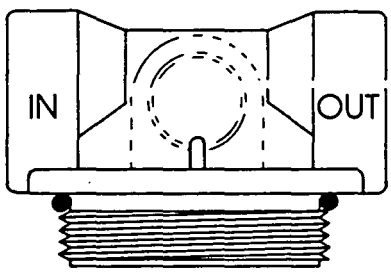

The **890 Series Distributor Heads** are molded of rugged composite plastic and are designed for single in-out applications on simple filters (sediment removal, taste, odor or pH neutralization).

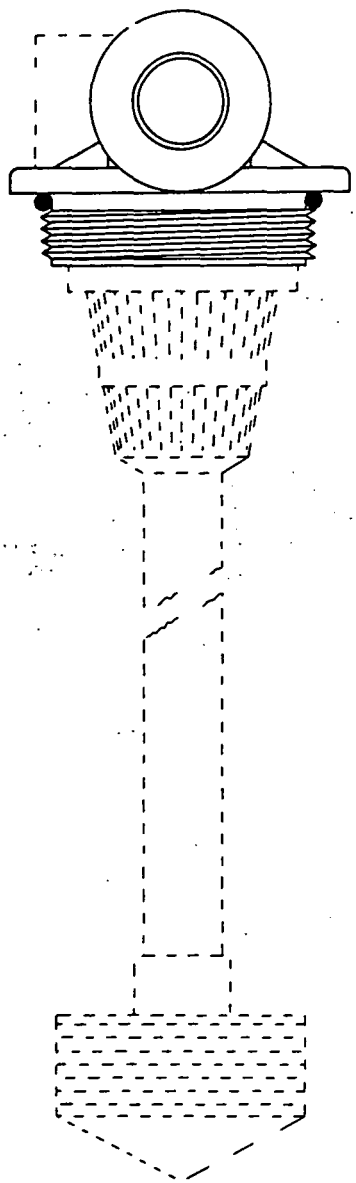
These economical heads will fit onto standard 2½"NPSM tank openings. A tapered riser port simplifies installation of $^{13}/_{16}$" riser pipes. Inlet and outlet are ¾"FNPT for easy straight line installation. A second ¾" outlet is available for water sampling or other applications. A complete line of top and bottom distributors and riser pipes is available. Consult factory for additional information.

**Hellenbrand Water Cond., Inc**
509 W. Main St., P. O. Box 187
Waunakee, WI 53597
(608) 849-5717 or 251-7681

Rugged economical plastic distributor heads for single in-out applications on simple filters.

# 890 Series Plastic Distributor Heads



| Order Number | Description | Tank Opening Size | 890 Dist. Head Inlet Size | 890 Dist. Head Outlet Size(s) | Riser Pipe Size |
|---|---|---|---|---|---|
| D7171 | 890S Distributor Head | 2½" | ¾" | ¾" | 13/16" |
| D7173 | 890C Distributor Head with two outlets | 2½" | ¾" | ¾"(2) | 13/16" |

A complete line of top and bottom Distributor Heads and Risers is available. Consult factory for additional information.

Specifications and dimensions subject to change without notice.

Clack Corporation

4462 Duraform Lane P.O. Box 500
Windsor, Wisconsin 53598-0500 USA
**Phone (608) 251-3010**
Fax No. (608) 846-2586

Form No. 1653
Replaces No. 1032
Printed in USA

# FILTRASORB 300 and 400 GRANULAR ACTIVATED CARBONS FOR POTABLE WATER TREATMENT

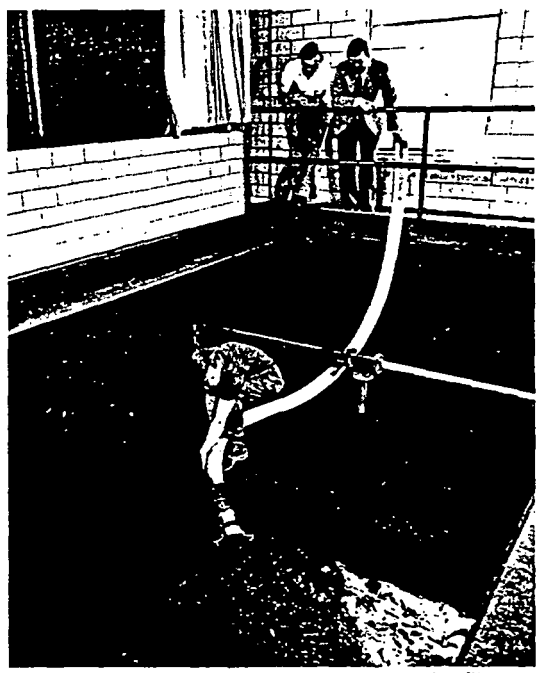
**ACTIVATED CARBON PRODUCT BULLETIN**

*TWO GRADES OF HIGH-ACTIVITY GRANULAR CARBON WHICH ENABLE THE MOST COST/EFFECTIVE REMOVAL OF TASTE, ODOR AND DISSOLVED ORGANICS FROM PUBLIC WATER SYSTEMS*

## description

Filtrasorb 300 and Filtrasorb 400 are highly-activated granular activated carbons developed by Calgon Carbon Corporation for the removal of taste, odor and dissolved organic contaminants from public water supplies.

Both carbons are manufactured from select grades of bituminous coal to produce a high-activity, durable granular product capable of withstanding the abrasion associated with repeated backwashing, air scouring, and hydraulic transport. Activation is carefully controlled to produce exceptionally high internal surface area with optimum pore size for effective adsorption of a broad range of high-and low-molecular-weight organic contaminants.



Hydraulic installation makes filling gravity filter beds with Filtrasorb granular activated carbon a simple and clean operation.

## purpose

Filtrasorb carbons can be used to upgrade water quality in existing sand filtration systems. Used as a complete replacement for sand or anthracite coal, Filtrasorb carbons function as a dual purpose medium; providing both filtration and adsorption. As a partial replacement for existing filter media, Filtrasorb can be used as an adsorbent to complement normal filtration processes. In either case, conversion to Filtrasorb imposes no major changes to a plant's normal filtration operations.

In situations where averge flow volume is so high that complete replacement of existing media does not provide sufficient contact time with the carbon, Calgon Carbon Corporation can provide complete modularized adsorption systems as an add-on treatment stage. Following existing facilities, these systems provide a rapid, effective and economical method of upgrading water quality to meet more stringent legislation, or to solve taste and odor problems.

## advantages

- **Proven Reliability** — Years of experience in more than 120 public water supply systems have established granular carbon adsorption as the most reliable taste and odor removal process available.
- **Reserve Capacity**—The reserve capacity of granular carbon can effectively control sudden water quality fluctuations and unexpected contamination. There are no messy adjustments of powdered carbon feed rate or problems of undertreatment or wasteful overtreatment.
- **Low Cost**—In plants using 2-4 ppm powdered carbon feed on a year-round basis, granular carbon filter beds are more economical.
- **Easy to Use**—Installation of granular carbon is a simple and clean operation. In use, it needs no more handling than conventional sand filter media—no bags of dusty powdered carbon to handle every day.

**Hellenbrand Water Cond., Inc**
509 W. Main St., P. O. Box 187
Waunakee, WI 53597
(608) 849-5717 or 251-7681

## specifications

| | FILTRASORB 300 | | FILTRASORB 400 | |
|---|---|---|---|---|
| | *Specification Value* | *Typical Analysis* | *Specification Value* | *Typical Analysis* |
| U.S. Standard Series Sieve Size | | | | |
| Larger than No. 8 | Max. 15% | 8 | — | — |
| Smaller than No. 30 | Max. 4% | 2 | — | — |
| Larger than No. 12 | — | — | Max. 5% | 1 |
| Smaller than No. 40 | — | — | Max. 4% | 2 |
| Iodine Number, min. | 900 | 970 | 1000 | 1050 |
| Abrasion Number, min. | 75 | 80 | 75 | 78 |
| Moisture (Max.) ..... | 2.0% | 0.8% | 2.0% | 0.9% |

## physical properties

| | FILTRASORB 300 | FILTRASORB 400 |
|---|---|---|
| Total surface area ($N_2$, BET method) $m^2/g$ ..... | 950-1050 | 1050-1200 |
| Bulk density, lbs/ft.$^{3*}$ ..... | 28 | 27 |
| Particle density wetted in water g/cc... | 1.3-1.4 | 1.3-1.4 |
| Pore volume cc/g..... | 0.85 | 0.94 |
| Effective size mm ..... | 0.8-1.0 | 0.55-0.75 |
| Uniformity coefficient (Max.)..... | 2.1 | 1.9 |

*Used to calculate volume requirements.

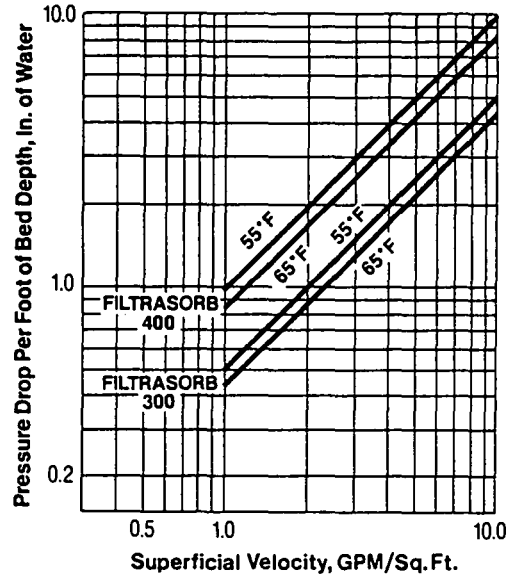
## packaging

Filtrasorb carbons can be supplied in 55-lb net bags, 1-ton bulk packs, or bulk shipped by rail car or tank truck.

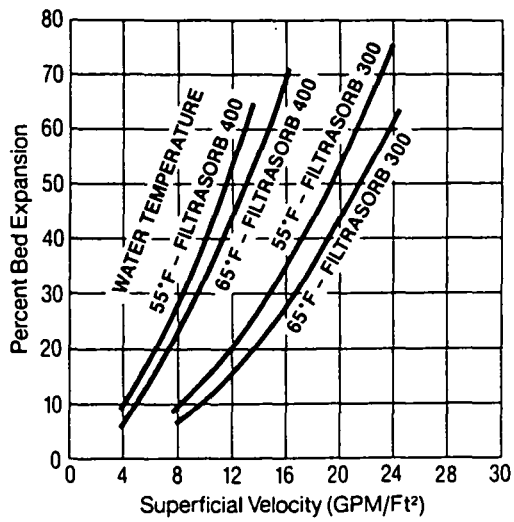
## caution

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low-oxygen spaces should be followed, including all applicable Federal and State requirements.

HEAD LOSS CHARACTERISTICS
PRESSURE DROP CURVES
FILTRASORB 300 AND FILTRASORB 400




FILTRASORB 300 AND FILTRASORB 400




*For additional information, contact Calgon Carbon Corporation, P.O. Box 717, Pittsburgh, Pennsylvania 15230-0717*

CALGON

**CALGON CARBON CORPORATION**

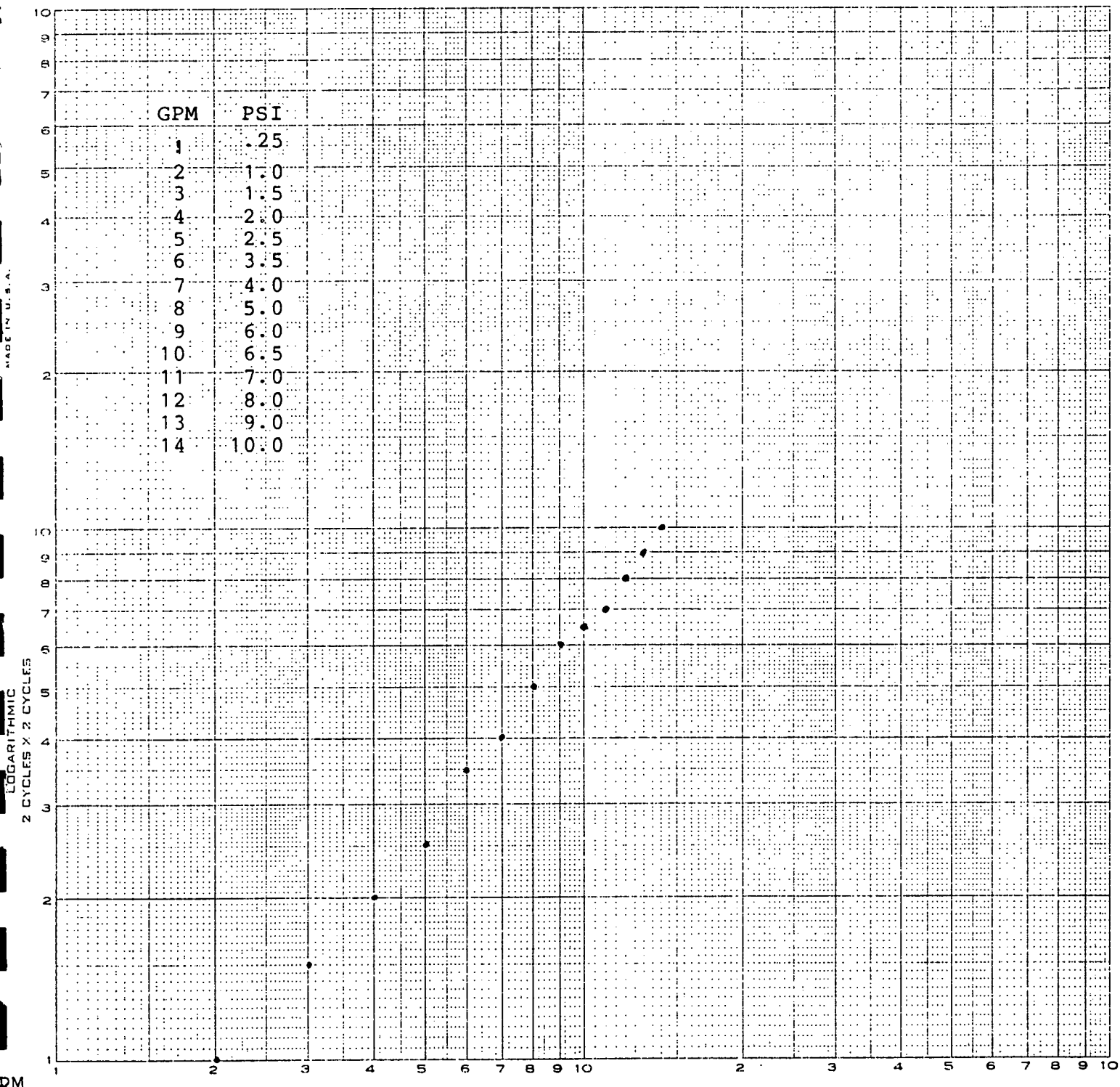
Printed in U.S.A.

# HELLENBRAND

## WATER CONDITIONERS, INC.

MODEL NO: POE-VOC-14

TESTED BY CLACK CORPORATION 11/09/89 @ 57 DEGREES F




| GPM | PSI |
|---|---|
| 1 | .25 |
| 2 | 1.0 |
| 3 | 1.5 |
| 4 | 2.0 |
| 5 | 2.5 |
| 6 | 3.5 |
| 7 | 4.0 |
| 8 | 5.0 |
| 9 | 6.0 |
| 10 | 6.5 |
| 11 | 7.0 |
| 12 | 8.0 |
| 13 | 9.0 |
| 14 | 10.0 |

Water Quality Association®
MEMBER

509 W. Main Street, P.O. Box 187
Waunakee, WI 53597

PHONES: (608) 849-5717, (608) 251-7681
FAX: (608) 849-7398

# APPENDIX D

## WDNR PRIVATE WATER SUPPLY TREATMENT APPLICATIONS

# STOPPLEWORTH PROPERTY
# WDNR APPLICATION INFORMATION

1. **Ownership of Well:**
   A.J. Stoppleworth
   7750 Hwy 14
   Middleton, WI 53562
   (608) 831-4214

2. **Location of Well:**
   SW 1/4
   SE 1/4 of Section 7
   T7N, R8E
   Town of Middleton
   Dane County

3. **Existing Water Supply Information:**

   a. **Original Well Driller and Date of Construction:**
   O'Conner, 1950

   b. **Well Casing Height and Well Seal:**
   24 inches above grade; no information available.

   c. **Description of System from Well to Pressure Tank:**
   The well is reported to have a submersible pump that discharges through a factory assembled spool adapter to a pressure tank in the basement.

   d. **Location of Sampling Faucet:**
   Sampling tap located behind residence

   e. **Distance from Septic Tank to Well:**
   110 feet

   f. **Average Daily Usage of Water:**
   220 gallons per day

   g. **Does Well and Water Supply System Comply with NR 112?**
   As per a telephone conversation with Robert Schaefer of the DNR, the existing water systems at the three residences will be inspected for NR 112 compliance within the near future.

   h. **Reasons Why Obtaining Uncontaminated Water Supply is Not Feasible:**
   The treatment system described in this application is intended to be an interim solution to the existing contaminated groundwater problem. This system is expected to be operational for approximately two years. A study is currently being performed to choose a suitable permanent solution to this problem.

4. **Treatment Unit Information:**

   a. **Product Trade Name and Model Number:**
   Hellenbrand POE-VOC-GAC-14

   b. **Sales Brochure with Manufacturer's Name, Address and Telephone Number:**
   See sales brochure in Appendix C of this report.

   c. **Installer's Name, Address and Telephone Number:**
   Hellenbrand Water Conditioners, Inc.
   509 W. Main St., P.O. Box 187
   Waunakee, WI 53597
   (608) 849-5717

   d. **Type of Carbon:**
   Calgon Filtrasorb 400

   e. **Copy of DILHR Approval Letter:**
   Application under review, will be forwarded upon receipt.

   f. **Maximum Flow Rate Capacity:**
   10 gallons per minute for three units in series, based on supplier's empty bed contact time requirement.

5. **Pilot Test Results:**
   See Appendix B of this report.

6. **A Description of the System Layout:**
   From the pressure tank, incoming water will first pass through an iron filter. Then the water will pass through a filter to remove particulates and then through an existing iron removal filter (to be rebedded). The water will then pass through three granulated activated carbon (GAC) units in series. A water meter will be installed before the first GAC unit. Sampling taps will be installed after each GAC unit and before the first unit. A valve will be installed before and after the particulate filter and between each GAC unit.

7. **Maintenance, Re-Bed, Disposal of Removed Contaminants:**
   Warzyn will subcontract the maintenance, re-bedding and disposal of the carbon units out to Hellenbrand for the first six months of operation. Sampling and analysis of the influent and effluent water quality will be performed by Warzyn for the first six months. After six months, the DNR will be responsible for maintenance, disposal and sampling. *

[jlv-601-48]

# SCHULTZ PROPERTY
# WDNR APPLICATION INFORMATION

1. **Ownership of Well:**
   Craig Schultz
   7734 Hwy 14
   Middleton, WI 53562
   (608) 831-2860

2. **Location of Well:**
   SW 1/4
   SE 1/4 of Section 7
   T7N, R8E
   Town of Middleton
   Dane County

3. **Existing Water Supply Information:**

   a. **Original Well Driller and Date of Construction:**
   Unknown

   b. **Well Casing Height and Well Seal:**
   8 inches above grade; slurry fill from 0 ft to 20 ft.

   c. **Description of System from Well to Pressure Tank:**
   Water drawn to surface by an in-line pump then to pressure tank located in basement.

   d. **Location of Sampling Faucet:**
   Sampling faucet is located after well head.

   e. **Distance from Septic Tank to Well:**
   100 feet

   f. **Average Daily Usage of Water:**
   170 gallons per day

   g. **Does Well and Water Supply System Comply with NR 112?**
   As per a telephone conversation with Robert Schaefer of the DNR, the existing water systems at the three residences will be inspected for NR 112 compliance within the near future.

   h. **Reasons Why Obtaining Uncontaminated Water Supply is Not Feasible:**
   The treatment system described in this application is intended to be an interim solution to the existing contaminated groundwater problem. This system is expected to be operational for approximately two years. A study is currently being performed to choose a suitable permanent solution to this problem.

4. **Treatment Unit Information:**

   a. **Product Trade Name and Model Number:**
   Hellenbrand POE-VOC-GAC-14

   b. **Sales Brochure with Manufacturer's Name, Address and Telephone Number:**
   See Sales brochure in Appendix C of this report.

   c. **Installer's Name, Address and Telephone Number:**
   Hellenbrand Water Conditioners, Inc.
   509 W. Main St., P.O. Box 187
   Waunakee, WI 53597
   (608) 849-5717

   d. **Type of Carbon:**
   Calgon Filtrasorb 400

   e. **Copy of DILHR Approval Letter:**
   Application under review, will be forwarded upon receipt.

   f. **Maximum Flow Rate Capacity:**
   10 gallons per minute for three units in series, based on supplier's empty bed contact time requirement.

5. **Pilot Test Results:**
   See Appendix B of this report.

6. **A Description of the System Layout:**
   From the pressure tank, incoming water will first pass through a filter to remove particulates. The water will then pass through three granulated activated carbon (GAC) units in series. A water meter will be installed before the first GAC unit. Sampling taps will be installed after each GAC unit and before the first unit. A valve will be installed before and after the particulate filter and between each GAC unit.

7. **Maintenance, Re-Bed, Disposal of Removed Contaminants:**
   Warzyn will subcontract the maintenance, re-bedding and disposal of the carbon units out to Hellenbrand for the first six months of operation. Sampling and analysis of the influent and effluent water quality will be performed by Warzyn for the first six months. After six months, the DNR will be responsible for maintenance, disposal and sampling.

[jlv-601-48]

# SWANSON PROPERTY
# WDNR APPLICATION INFORMATION

1. **Ownership of Well:**
   Randall C. Swanson
   Sunnyside Seed Farm
   7775 Hwy 14
   Middleton, WI 53562
   (608) 836-8664

2. **Location of Well:**
   SW 1/4
   SE 1/4 of Section 7
   T7N, R8E
   Town of Middleton
   Dane County

3. **Existing Water Supply Information:**

   a. **Original Well Driller and Date of Construction:**
   Unknown. It is understood from Mr. Fred Wallin that the well is a driven well point installed by him.

   b. **Well Casing Height and Well Seal:**
   Well pit installation approximately 4 to 5 ft deep; seal unknown.

   c. **Description of System from Well to Pressure Tank:**
   A jet pump located adjacent to the pressure tank in the basement draws water from the well to the pressure tank.

   d. **Location of Sampling Faucet:**
   Sampling faucet located after pressure tank.

   e. **Distance from Septic Tank to Well:**
   100 feet

   f. **Average Daily Usage of Water:**
   170 gallons per day

   g. **Does Well and Water Supply System Comply with NR 112?**
   As per a telephone conversation with Robert Schaefer of the DNR, the existing water systems at the three residences will be inspected for NR 112 compliance within the near future.

   h. **Reasons Why Obtaining Uncontaminated Water Supply is Not Feasible:**
   The treatment system described in this application is intended to be an interim solution to the existing contaminated groundwater problem. This system is expected to be operational for approximately two years. A study is currently being performed to choose a suitable permanent solution to this problem.

4. **Treatment Unit Information:**

   a. **Product Trade Name and Model Number:**
   Hellenbrand POE-VOC-GAC-14

   b. **Sales Brochure with Manufacturer's Name, Address and Telephone Number:**
   See sales brochure in Appendix C of this report.

   c. **Installer's Name, Address and Telephone Number:**
   Hellenbrand Water Conditioners, Inc.
   509 W. Main St., P.O. Box 187
   Waunakee, WI 53597
   (608) 849-5717

   d. **Type of Carbon:**
   Calgon Filtrasorb 400

   e. **Copy of DILHR Approval Letter:**
   Application under review, will be forwarded upon receipt.

   f. **Maximum Flow Rate Capacity:**
   7 gallons per minute for three units in series, based on supplier's empty bed contact time requirement.

5. **Pilot Test Results:**
   See Appendix B of this report.

6. **A Description of the System Layout:**
   From the pressure tank, incoming water will first pass through a filter to remove particulates. The water will then pass through two granulated activated carbon (GAC) units in series. A water meter will be installed before the first GAC unit. Sampling taps will be installed after each GAC unit and before the first unit. A valve will be installed before and after the particulate filter and between each GAC unit.

7. **Maintenance, Re-Bed, Disposal of Removed Contaminants:**
   Warzyn will subcontract the maintenance, re-bedding and disposal of the carbon units out to Hellenbrand for the first six months of operation. Sampling and analysis of the influent and effluent water quality will be performed by Warzyn for the first six months. After six months, the DNR will be responsible for maintenance, disposal and sampling.

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